

February 3, 2016

West Virginia Department of Environmental Protection  
Division of Air Quality  
601 57<sup>th</sup> Street, S.E.  
Charleston, WV 25304-2345



RE: Process Description



Dear Ms. McKeone,

Shalewater Solutions, LLC (SWS) is constructing a temporary water treatment/recycling facility in Doddridge County, West Virginia. The treatment and recycling operations at this facility are designed to accept brine from nearby oil and gas wells via truck offload at a maximum of 1,500 barrels per day. The facility will be operated with electric power provided by the local electric company with no permanent generators utilized for the daily operations. The brine is treated through a series of pre-treatment, settling, and weir tanks. Treatment is chemical & physical with no thermal or air stripping processes. The treated effluent is loaded onto trucks for transport to nearby oil and gas wells or to approved disposal wells. The residuals generated from treatment operations are dewatered on site via a plate & frame filter press or geo-bag dewatering system then transported to an approved landfill.

This submittal provides documentation that addresses water balance, our treatment scheme detail, water source and destination, as well as the site design illustrating the zero storm-water discharge precautions.

If you have questions or need anything further, please call Doug Amos with Hatch Mott MacDonald at 304-415-6366.

Sincerely,

Tony Gutta  
NEBU President  
HEP Shalewater Solutions, LLC

**Attachments**

XC: Ricardo Chambers, Hatch Mott MacDonald



WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
DIVISION OF AIR QUALITY  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304  
Phone: (304) 926-0475  
www.dep.wv.gov/daq

**PERMIT DETERMINATION FORM  
(PDF)**

FOR AGENCY USE ONLY: PLANT I.D. # \_\_\_\_\_  
PDF # \_\_\_\_\_ PERMIT WRITER \_\_\_\_\_

1. NAME OF APPLICANT (AS REGISTERED WITH THE WV SECRETARY OF STATE'S OFFICE):

HEP Shalewater Solutions, LLC

2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):

Central Station Facility

3. NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODE:

213112

4A. MAILING ADDRESS:

37 Grande Meadows Drive, Ste 201, Bridgeport, WV 26330

4B. PHYSICAL ADDRESS:

37 Grande Meadows Drive, Ste 201, Bridgeport, WV 26330

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE MAP AS ATTACHMENT A): Travel 0.185 miles on WV county route 11, off US Route 50 (See map attached).

5B. NEAREST ROAD:

County Road 11

5C. NEAREST CITY OR TOWN:

West Union

5D. COUNTY:

Doddridge

5E. UTM NORTHING (KM):

4347954.76

5F. UTM EASTING (KM):

516169.00

5G. UTM ZONE:

-17S

6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED:

Brett Gump

6B. TITLE:

EH&S Manager

6C. TELEPHONE:

304-476-7432

6D. FAX:

6E. E-MAIL:

bgump@shalewater.com

7A. DAQ PLANT I.D. NO. (FOR AN EXISTING FACILITY ONLY):

\_\_\_\_\_

7B. PLEASE LIST ALL CURRENT 45CSR13, 45CSR14, 45CSR19 AND/OR TITLE V (45CSR30) PERMIT NUMBERS ASSOCIATED WITH THIS PROCESS (FOR AN EXISTING FACILITY ONLY):

7C. IS THIS PDF BEING SUBMITTED AS THE RESULT OF AN ENFORCEMENT ACTION? IF YES, PLEASE LIST:

NO

8A. TYPE OF EMISSION SOURCE (CHECK ONE):

- NEW SOURCE     ADMINISTRATIVE UPDATE  
 MODIFICATION     OTHER (PLEASE EXPLAIN IN 11B)

8B. IF ADMINISTRATIVE UPDATE, DOES DAQ HAVE THE APPLICANT'S CONSENT TO UPDATE THE EXISTING PERMIT WITH THE INFORMATION CONTAINED HEREIN?

- YES     NO

9. IS DEMOLITION OR PHYSICAL RENOVATION AT AN EXISTING FACILITY INVOLVED?     YES     NO

10A. DATE OF ANTICIPATED INSTALLATION OR CHANGE:

2/4/2016

10B. DATE OF ANTICIPATED START-UP:

02/15/2016

11A. PLEASE PROVIDE A DETAILED PROCESS FLOW DIAGRAM SHOWING EACH PROPOSED OR MODIFIED PROCESS EMISSION POINT AS ATTACHMENT B.

11B. PLEASE PROVIDE A DETAILED PROCESS DESCRIPTION AS ATTACHMENT C.

12. PLEASE PROVIDE MATERIAL SAFETY DATA SHEETS (MSDS) FOR ALL MATERIALS PROCESSED, USED OR PRODUCED AS ATTACHMENT D. FOR CHEMICAL PROCESSES, PLEASE PROVIDE A MSDS FOR EACH COMPOUND EMITTED TO AIR.

**13A. REGULATED AIR POLLUTANT EMISSIONS:**

⇒ **FOR A NEW FACILITY**, PLEASE PROVIDE PLANT WIDE EMISSIONS BASED ON THE POTENTIAL TO EMIT (PTE) FOR THE FOLLOWING AIR POLLUTANTS INCLUDING ALL PROCESSES.  
 ⇒ **FOR AN EXISTING FACILITY**, PLEASE PROVIDE THE PROPOSED CHANGE IN EMISSIONS BASED ON THE PTE OF ALL PROCESS CHANGES FOR THE FOLLOWING AIR POLLUTANTS.  
*PTE FOR A GIVEN POLLUTANT IS TYPICALLY BEFORE AIR POLLUTION CONTROL DEVICES AND IS COLLECTED BASED ON THE MAXIMUM DESIGN CAPACITY OF PROCESS EQUIPMENT.*

| POLLUTANT               | HOURLY PTE (LB/HR)          | YEARLY PTE (TON/YR)<br>(HOURLY PTE MULTIPLIED BY 8760 HR/YR)<br>DIVIDED BY 2000 LB/TON |
|-------------------------|-----------------------------|--|
| PM                      | Minimize using dust control | N/A  |
| PM <sub>10</sub>        | Minimize using dust control | N/A  |
| VOCs                    | 0.051                       | 0.223  |
| CO                      | N/A                         | N/A  |
| NO <sub>x</sub>         | N/A                         | N/A  |
| SO <sub>2</sub>         | N/A                         | N/A  |
| Pb                      | N/A                         | N/A  |
| HAPs (AGGREGATE AMOUNT) | 0.05                        | 0.22   |
| TAPs (INDIVIDUALLY)*    | 0.026                       | 0.06   |
| OTHER (INDIVIDUALLY)*   | N/A                         | N/A  |

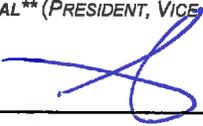
\* ATTACH ADDITIONAL PAGES AS NEEDED

**13B. PLEASE PROVIDE ALL SUPPORTING CALCULATIONS AS ATTACHMENT E.**

*CALCULATE AN HOURLY AND YEARLY PTE OF EACH PROCESS EMISSION POINT (SHOWN IN YOUR DETAILED PROCESS FLOW DIAGRAM) FOR ALL AIR POLLUTANTS LISTED ABOVE INCLUDING INDIVIDUAL HAP'S (LISTED IN SECTION 112(b) OF THE 1990 CAAA), TAP'S (LISTED IN 45CSR27), AND OTHER AIR POLLUTANTS (E.G. POLLUTANTS LISTED IN TABLE 45-13A OF 45CSR13, MINERAL ACIDS PER 45CSR7, ETC.).*

**14. CERTIFICATION OF DATA**

I, TONY GUTTA (TYPE NAME) ATTEST THAT ALL THE REPRESENTATIONS CONTAINED IN THIS APPLICATION, OR APPENDED HERETO, ARE TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE BASED ON INFORMATION AND BELIEF AFTER REASONABLE INQUIRY, AND THAT I AM A **RESPONSIBLE OFFICIAL**\*\* (PRESIDENT, VICE-PRESIDENT, SECRETARY OR TREASURER, GENERAL PARTNER OR SOLE PROPRIETOR) OF THE APPLICANT.

SIGNATURE OF RESPONSIBLE OFFICIAL: 

TITLE: PRESIDENT NEBU

DATE: 02 / 04 / 2016

\*\* THE DEFINITION OF THE PHRASE 'RESPONSIBLE OFFICIAL' CAN BE FOUND AT 45CSR13, SECTION 2.23.

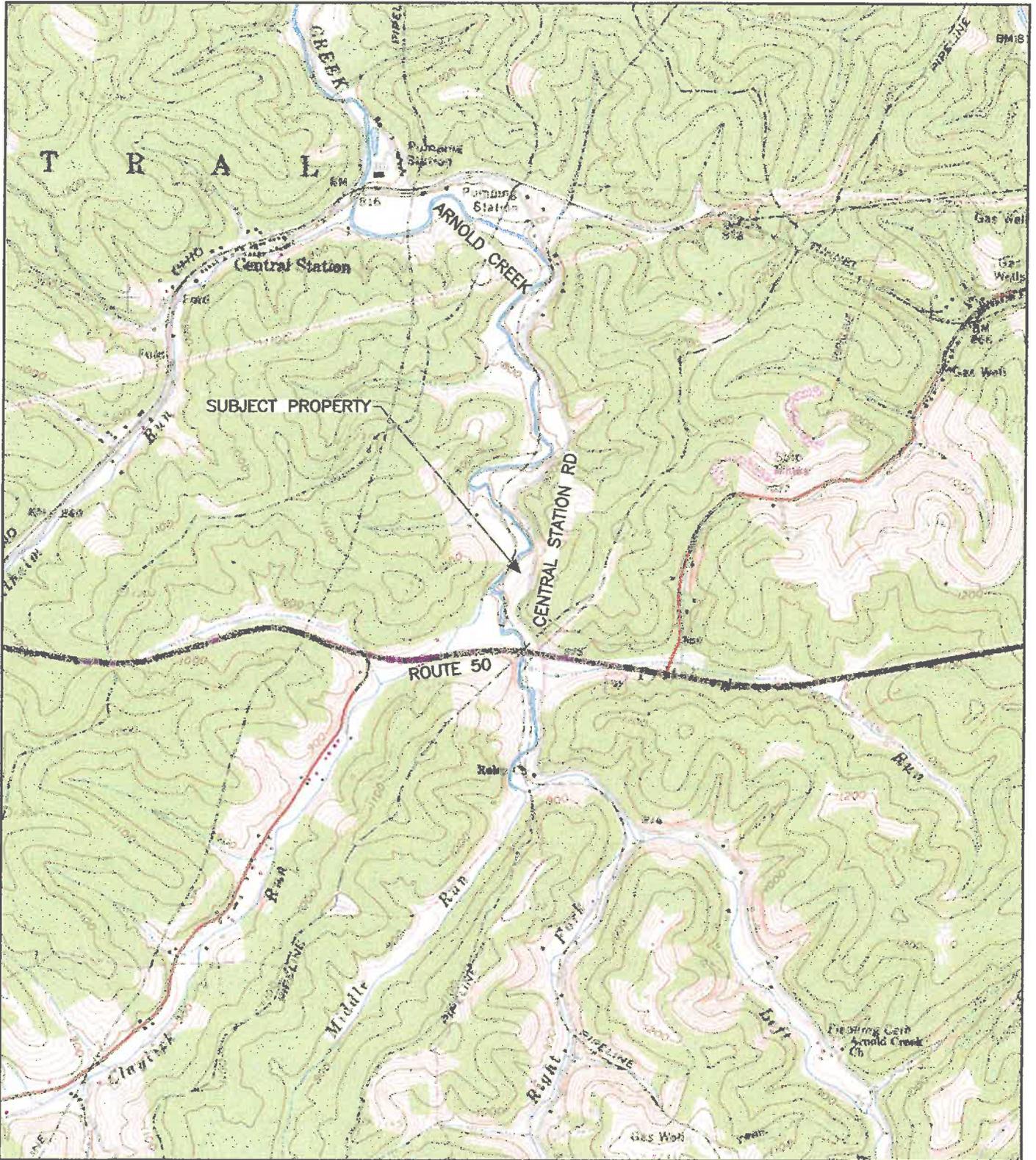
**NOTE: PLEASE CHECK ENCLOSED ATTACHMENTS:**

ATTACHMENT A    ATTACHMENT B    ATTACHMENT C    ATTACHMENT D    ATTACHMENT E

RECORDS ON ALL CHANGES ARE REQUIRED TO BE KEPT AND MAINTAINED ON-SITE FOR TWO (2) YEARS

THE PERMIT DETERMINATION FORM WITH THE INSTRUCTIONS CAN BE FOUND ON DAQ'S PERMITTING SECTION WEB SITE.

[www.dep.wv.gov/daq](http://www.dep.wv.gov/daq)



**FIGURE 1**  
**U.S.G.S. SITE LOCATION**  
**CENTRAL STATION FACILITY**  
 WEST UNION QUADRANGLE 1987, WEST VIRGINIA  
 DODDRIDGE COUNTY, WEST VIRGINIA

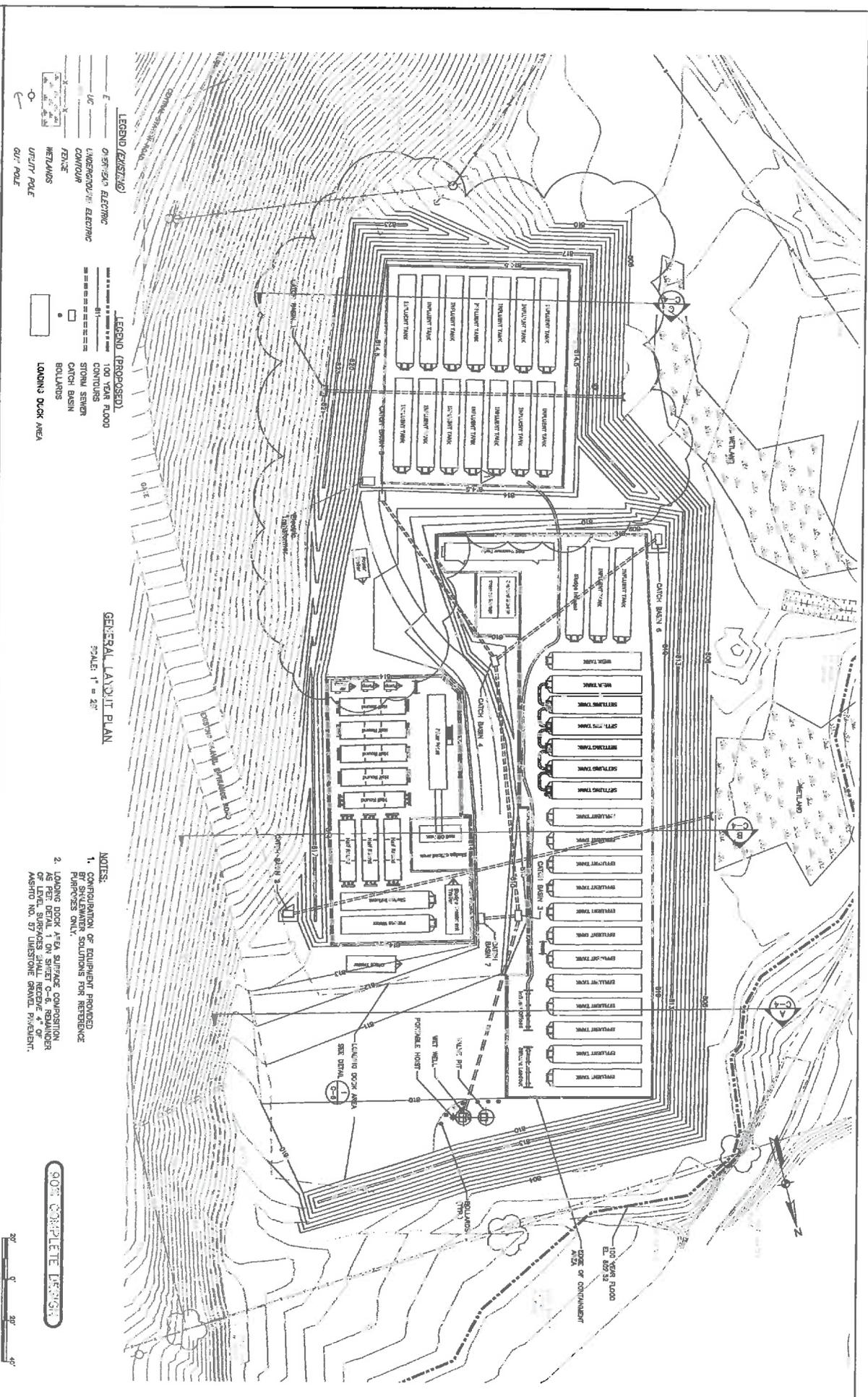


**Hatch Mott MacDonald**  
 1007 Corporate Drive, Suite 100  
 Canonsburg, PA 15317  
 Ph: (724) 514-5300 | Fax: (724) 873-9110



|              |            |
|--------------|------------|
| DRAWN BY:    | BP         |
| APPROVED BY: | RAC        |
| DATE:        | 11/12/2015 |
| PAGE:        | 1 of 1     |

1:2500 = 2000 FEET



- LEGEND (EXISTING)**
- 0-575-KV ELECTRIC
  - 10KV/20KV ELECTRIC
  - CONTOUR
  - FENCE
  - WETLANDS
  - UTILITY POLE
  - GUY POLE
- LEGEND (PROPOSED)**
- 100 YEAR FLOOD
  - CONTOURS
  - STORM SEWER
  - CATCH BASIN
  - BOLLARDS
  - LOADING DOCK AREA

**GENERAL LAYOUT PLAN**  
SCALE: 1" = 20'

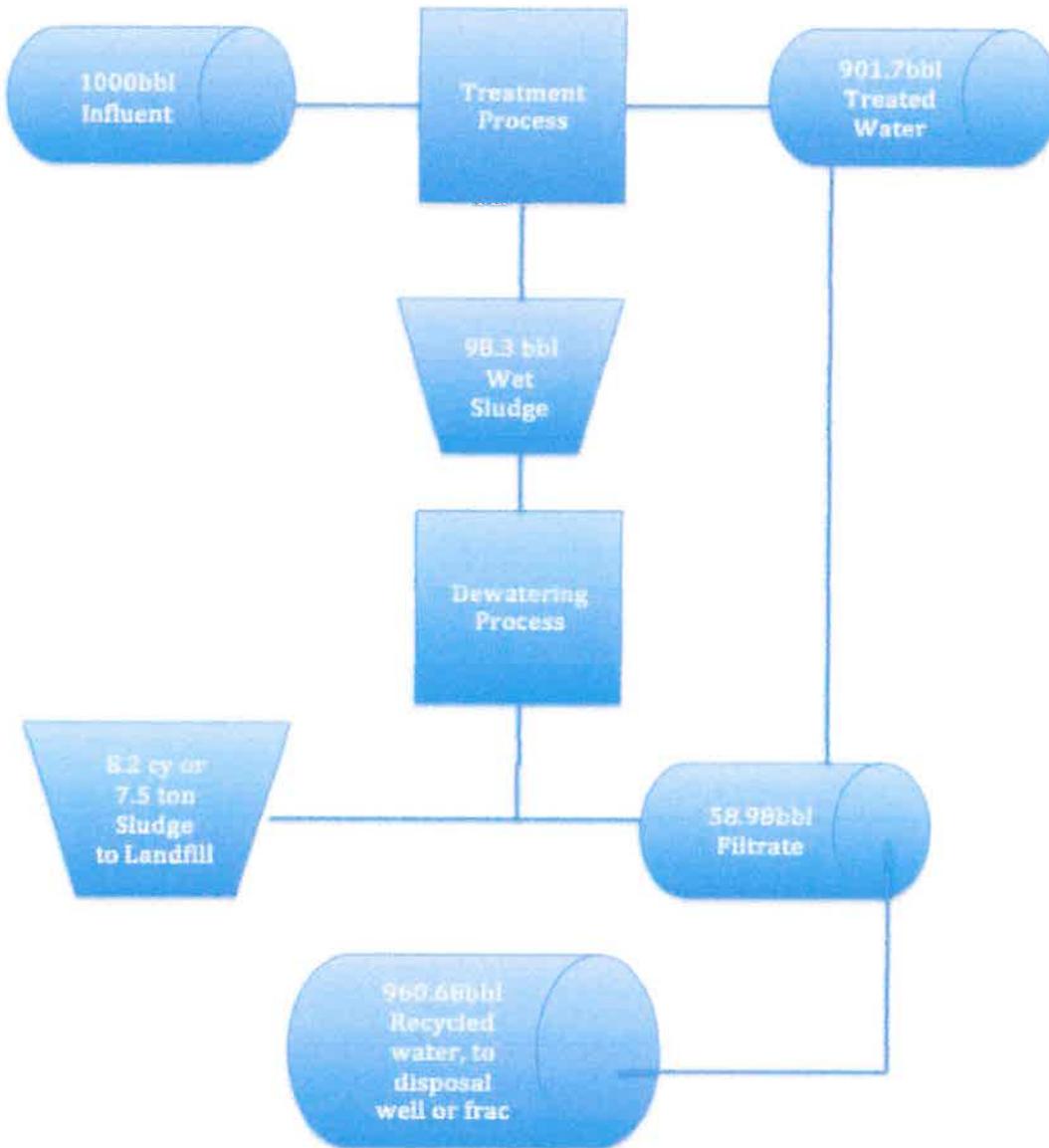
- NOTES:**
1. CONFIGURATION OF EQUIPMENT PROVIDED BY SHALEWATER SOLUTIONS FOR REFERENCE PURPOSES ONLY.
  2. LOADING DOCK AREA SURFACE COMPOSITION AS PER DETAIL 1 ON SHEET C-6. REMAINDER OF LEVEL SURFACES SHALL RECEIVE 4" OF ASPHALT NO. 57 UNLESS OTHERWISE SPECIFIED.

**80% COMPLETE DESIGN**



|  |             |  |           |   |         |
|--|-------------|--|-----------|---|---------|
| <p>Hatch Mott MacDonald<br/>1800 West Carson Street<br/>Pittsburgh, Pennsylvania 15219</p> |             | <p>Shalewater Solutions<br/>Central Station Proposed Site<br/><b>GENERAL LAYOUT PLAN</b></p> |           | <p>SHALEWATER SOLUTIONS<br/>3100 WILSON ROAD<br/>ROCKFORD, WV 26010<br/>WWW.SHALEWATERSOLUTIONS.COM</p> |         |
| DATE   | DESCRIPTION | DESIGNED BY  | DRAWN BY  | CHK. BY   | APP. BY |
| 1/21/2018  | 1.37 PL     | AS   | AS        | AS  | AS      |
| FILE NAME  | PROJECT NO. | SCALE  | SHEET NO. |   |         |
| 1/21/2018  | 1.37 PL     | 1" = 20'   | 1 OF 1    |   |         |





**Figure 4. Water Balance Diagram of the proposed temporary facility**

This proposal contains *proprietary and confidential information* of Shalewater Solutions, LLC., and shall not be used, disclosed or reproduced, in whole or in part, for any purpose other than to evaluate this proposal, without the prior written consent of Shalewater Solutions LLC., title in and to this document and all information contained herein remains at all time in Shalewater Solutions, LLC.

## Attachment E

Project Name: Central Station Facility

Project #: 364111

Subject: Calculations

### Detectable VOC's (from Analytical Report, page 9)

| <u>Analyte</u>  | <u>Result (µg/L)</u> |
|---|----------------------|
| Benzene   | 590                  |
| Ethylbenzene  | 38                   |
| Cyclohexane   | 40                   |
| Toluene   | 1,100                |
| Xylenes   | 550                  |
| <hr style="width: 20%; margin-left: auto; margin-right: 0;"/> |                      |
| <b>TOTAL</b>  | <b>2,318 µg/L</b>    |

- The maximum daily treatment capacity for the facility will be 1,500 barrels. However, it will not be constant
- Operating shift for the facility will be 24 hours per day
- The treatment operations will take place in closed up frac tanks. This will minimize emissions

### Calculations

$$\left(\frac{2,318 \mu\text{g}}{L}\right) \left(\frac{1\text{g}}{1 \times 10^6 \mu\text{g}}\right) \left(\frac{0.008344 \text{ lbs / gal}}{1 \frac{\text{g}}{L}}\right) \left(\frac{1,500 \text{ bbl}}{24 \text{ hr}}\right) \left(\frac{42 \text{ gal}}{1 \text{ bbl}}\right)$$

$$= 0.051 \frac{\text{lbs}}{\text{hr}} = \text{VOC loading}$$

**Detectable HAP's (from Analytical Report, page 9)**

| <u>Analyte</u> | <u>Result (µg/L)</u> | <u>Individual (lbs/hr)</u> |
|----------------|----------------------|----------------------------|
| Benzene        | 590                  | 0.026                      |
| Ethylbenzene   | 38                   | 0.0017                     |
| Toluene        | 1,100                | 0.048                      |
| Xylenes        | 550                  | 0.024                      |
|                | -----                |                            |
| <b>TOTAL</b>   | <b>2,278 µg/L</b>    |                            |

**Calculations**

$$\left(\frac{2,278\mu\text{g}}{L}\right)\left(\frac{1\text{g}}{1\times 10^6\mu\text{g}}\right)\left(\frac{0.008344\text{lbs/gal}}{1\frac{\text{g}}{L}}\right)\left(\frac{1,500\text{bbl}}{24\text{hr}}\right)\left(\frac{42\text{gal}}{1\text{bbl}}\right)$$

$$= 0.05 \frac{\text{lbs}}{\text{hr}} = \text{HAP loading}$$

**Detectable TAP's (from Analytical Report, page 9)**

| <u>Analyte</u> | <u>Result (µg/L)</u> |
|----------------|----------------------|
| Benzene        | 590                  |

**Calculations**

$$\left(\frac{590\mu\text{g}}{L}\right)\left(\frac{1\text{g}}{1\times 10^6\mu\text{g}}\right)\left(\frac{0.008344\text{lbs/gal}}{1\frac{\text{g}}{L}}\right)\left(\frac{1,500\text{bbl}}{24\text{hr}}\right)\left(\frac{42\text{gal}}{1\text{bbl}}\right)$$

$$= 0.013 \frac{\text{lbs}}{\text{hr}} = \text{HAP loading}$$

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.  
TestAmerica Pittsburgh  
301 Alpha Drive  
RIDC Park  
Pittsburgh, PA 15238  
Tel: (412)963-7058

TestAmerica Job ID: 180-46038-1  
Client Project/Site: Air Permit

For:  
Shalewater Solutions, LLC  
37 Grande Meadows Dr  
Ste 201  
Bridgeport, West Virginia 26330

Attn: Ryan Hall



Authorized for release by:  
7/24/2015 10:01:34 AM

John McFadden, Project Manager I  
(330)497-9396  
[john.mcfadden@testamericainc.com](mailto:john.mcfadden@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?

 **Ask  
The  
Expert**

Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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## Case Narrative

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

Job ID: 180-46038-1

Laboratory: TestAmerica Pittsburgh

### Narrative

### Job Narrative 180-46038-1

#### Comments

No additional comments.

#### Receipt

The sample was received on 7/17/2015 6:20 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.5° C.

#### GC/MS VOA

Method(s) 8260C: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for 148426 recovered outside control limits for the following analytes: 1,1,2-Trichloro-1,2,2-trifluoroethane, 1,1-Dichloroethene, Acetone & Methylene Chloride. These analytes were biased high in the LCS and were not detected in the associated samples when it was a target analyte; therefore the data have been reported.

Method(s) 8260C: The %RPD of the laboratory control sample (LCS) and laboratory control standard duplicate (LCSD) for preparation batch 148426 recovered outside control limits for the following analytes: 1,1,2-Trichloro-1,2,2-trifluoroethane, 1,2-Dibromo-3-Chloropropane, 1,1-Dichloroethene, 2-Hexanone, Acetone and Methylene Chloride.

Method(s) 8260C: The following sample was diluted to bring the concentration of target analytes within the calibration range: MILEY EFFLUENT (180-46038-1). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### GC/MS Semi VOA

Method(s) 8270D: Surrogate Terphenyl-d14 recovery for the following sample was outside control limits: MILEY EFFLUENT (180-46038-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

# Definitions/Glossary

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

## Qualifiers

### GC/MS VOA

| Qualifier | Qualifier Description  |
|-----------|--|
| U         | Indicates the analyte was analyzed for but not detected.   |
| *         | LCS or LCSD is outside acceptance limits.  |
| *         | RPD of the LCS and LCSD exceeds the control limits   |
| J         | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |

### GC/MS Semi VOA

| Qualifier | Qualifier Description  |
|-----------|--|
| U         | Indicates the analyte was analyzed for but not detected.   |
| J         | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| X         | Surrogate is outside control limits  |

## Glossary

| Abbreviation   | These commonly used abbreviations may or may not be present in this report.                                 |
|----------------|---|
| α              | Listed under the "D" column to designate that the result is reported on a dry weight basis                  |
| %R             | Percent Recovery  |
| CFL            | Contains Free Liquid  |
| CNF            | Contains no Free Liquid   |
| DER            | Duplicate error ratio (normalized absolute difference)  |
| Dil Fac        | Dilution Factor   |
| DL, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC            | Decision level concentration  |
| MDA            | Minimum detectable activity   |
| EDL            | Estimated Detection Limit   |
| MDC            | Minimum detectable concentration  |
| MDL            | Method Detection Limit  |
| ML             | Minimum Level (Dioxin)  |
| NC             | Not Calculated  |
| ND             | Not detected at the reporting limit (or MDL or EDL if shown)  |
| PQL            | Practical Quantitation Limit  |
| QC             | Quality Control   |
| RER            | Relative error ratio  |
| RL             | Reporting Limit or Requested Limit (Radiochemistry)   |
| RPD            | Relative Percent Difference, a measure of the relative difference between two points                        |
| TEF            | Toxicity Equivalent Factor (Dioxin)   |
| TEQ            | Toxicity Equivalent Quotient (Dioxin)   |

## Certification Summary

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

### Laboratory: TestAmerica Pittsburgh

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

| Authority              | Program       | EPA Region | Certification ID | Expiration Date |
|------------------------|---------------|------------|------------------|-----------------|
| Arkansas DEQ           | State Program | 6          | 88-0690          | 06-27-16        |
| California             | State Program | 9          | 2891             | 03-31-16        |
| Connecticut            | State Program | 1          | PH-0688          | 09-30-16        |
| Florida                | NELAP         | 4          | E871008          | 06-30-16        |
| Illinois               | NELAP         | 5          | 002602           | 06-30-16        |
| Kansas                 | NELAP         | 7          | E-10350          | 07-31-15        |
| Louisiana              | NELAP         | 6          | 04041            | 06-30-16        |
| New Hampshire          | NELAP         | 1          | 203011           | 04-04-16        |
| New Jersey             | NELAP         | 2          | PA005            | 09-30-15        |
| New York               | NELAP         | 2          | 11182            | 03-31-16        |
| North Carolina (VW/SW) | State Program | 4          | 434              | 12-31-15        |
| Pennsylvania           | NELAP         | 3          | 02-00416         | 04-30-16        |
| South Carolina         | State Program | 4          | 89014            | 04-30-16        |
| Texas                  | NELAP         | 6          | T104704528       | 03-31-16        |
| US Fish & Wildlife     | Federal       |            | LE94312A-1       | 11-30-15        |
| USDA                   | Federal       |            | P-Soil-01        | 05-23-16        |
| Utah                   | NELAP         | 8          | STLP             | 05-31-16        |
| Virginia               | NELAP         | 3          | 460189           | 09-14-15        |
| West Virginia DEP      | State Program | 3          | 142              | 01-31-16        |
| Wisconsin              | State Program | 5          | 998027800        | 08-31-15        |

### Laboratory: TestAmerica Canton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

| Authority         | Program       | EPA Region | Certification ID | Expiration Date |
|-------------------|---------------|------------|------------------|-----------------|
| California        | NELAP         | 9          | 01144CA          | 06-30-14 *      |
| California        | State Program | 9          | 2927             | 04-30-17        |
| Connecticut       | State Program | 1          | PH-0590          | 12-31-15        |
| Illinois          | NELAP         | 5          | 200004           | 07-31-16        |
| Kansas            | NELAP         | 7          | E-10336          | 05-31-15 *      |
| Kentucky (UST)    | State Program | 4          | 58               | 02-26-16        |
| Kentucky (VW)     | State Program | 4          | 98016            | 12-31-15        |
| L-A-B             | DoD ELAP      |            | L2315            | 07-18-16        |
| Minnesota         | NELAP         | 5          | 039-999-348      | 12-31-15        |
| Nevada            | State Program | 9          | OH-000482008A    | 07-31-15 *      |
| New Jersey        | NELAP         | 2          | OH001            | 09-30-15 *      |
| New York          | NELAP         | 2          | 10975            | 03-31-16 *      |
| Ohio VAP          | State Program | 5          | CL0024           | 10-31-15        |
| Oregon            | NELAP         | 10         | 4062             | 02-23-16        |
| Pennsylvania      | NELAP         | 3          | 68-00340         | 08-31-15 *      |
| Texas             | NELAP         | 6          |                  | 08-31-15 *      |
| USDA              | Federal       |            | P330-13-00319    | 11-26-16        |
| Virginia          | NELAP         | 3          | 460175           | 09-14-15        |
| Washington        | State Program | 10         | C971             | 01-12-16        |
| West Virginia DEP | State Program | 3          | 210              | 12-31-15        |
| Wisconsin         | State Program | 5          | 999518190        | 08-31-15 *      |

\* Certification renewal pending - certification considered valid.

TestAmerica Pittsburgh

# Sample Summary

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

| Lab Sample ID | Client Sample ID | Matrix | Collected      | Received       |
|---------------|------------------|--------|----------------|----------------|
| 180-46038-1   | MILEY EFFLUENT   | Water  | 07/17/15 15:00 | 07/17/15 18:20 |



# Method Summary

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

| Method | Method Description                     | Protocol | Laboratory |
|--------|--|----------|------------|
| 8260C  | Volatile Organic Compounds by GC/MS    | SW846    | TAL PIT    |
| 8270D  | Semivolatile Organic Compounds (GC/MS) | SW846    | TAL PIT    |

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058



# Lab Chronicle

Client: Shalewater Solutions, LLC  
 Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

**Client Sample ID: MILEY EFFLUENT**

**Lab Sample ID: 180-46038-1**

Date Collected: 07/17/15 15:00

Matrix: Water

Date Received: 07/17/15 18:20

| Prep Type            | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab     |
|----------------------|------------|--------------|-----|------------|----------------|--------------|--------------|----------------------|---------|---------|
| Total/NA             | Analysis   | 8260C        |     | 30         | 5 mL           | 5 mL         | 148426       | 07/22/15 15:56       | PJJ     | TAL PIT |
| Instrument ID: CHHP4 |            |              |     |            |                |              |              |                      |         |         |
| Total/NA             | Prep       | 3520C        |     |            | 1060 mL        | 10.0 mL      | 148449       | 07/22/15 09:14       | BJT     | TAL PIT |
| Total/NA             | Analysis   | 8270D        |     | 1          | 1060 mL        | 10.0 mL      | 148562       | 07/23/15 10:53       | SAB     | TAL PIT |
| Instrument ID: CH731 |            |              |     |            |                |              |              |                      |         |         |

**Laboratory References:**

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

**Analyst References:**

Lab: TAL PIT

Batch Type: Prep

BJT = Bill Trout

Batch Type: Analysis

PJJ = Patrick Journet

SAB = Sharon Bacha



# Client Sample Results

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

Client Sample ID: MILEY EFFLUENT

Lab Sample ID: 180-46038-1

Date Collected: 07/17/15 15:00

Matrix: Water

Date Received: 07/17/15 18:20

| Method: 8260C - Volatile Organic Compounds by GC/MS |             |           |     |     |      |   |          |                |         |
|---|-------------|-----------|-----|-----|------|---|----------|----------------|---------|
| Analyte   | Result      | Qualifier | RL  | MDL | Unit | D | Prepared | Analyzed       | Dil Fac |
| 1,1,1-Trichloroethane                               | 31          | U         | 150 | 31  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,1,2,2-Tetrachloroethane                           | 28          | U         | 150 | 28  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,1,2-Trichloro-1,2,2-trifluoroethane               | 9.9         | U *       | 150 | 9.9 | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,1,2-Trichloroethane                               | 35          | U         | 150 | 35  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,1-Dichloroethane                                  | 30          | U         | 150 | 30  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,1-Dichloroethene                                  | 32          | U *       | 150 | 32  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,2-Dibromo-3-Chloropropane                         | 11          | U *       | 150 | 11  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,2-Dichlorobenzene                                 | 20          | U         | 150 | 20  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,2-Dichloroethane                                  | 29          | U         | 150 | 29  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,2-Dichloropropane                                 | 38          | U         | 150 | 38  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,2,4-Trichlorobenzene                              | 11          | U         | 150 | 11  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,3-Dichlorobenzene                                 | 15          | U         | 150 | 15  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,4-Dichlorobenzene                                 | 16          | U         | 150 | 16  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 2-Butanone (MEK)                                    | 33          | U         | 150 | 33  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 2-Hexanone  | 17          | U *       | 150 | 17  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 4-Methyl-2-pentanone (MIBK)                         | 18          | U         | 150 | 18  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Acetone   | 150         | U *       | 600 | 150 | ug/L |   |          | 07/22/15 15:56 | 30      |
| <b>Benzene</b>                                      | <b>590</b>  |           | 150 | 30  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Bromoform   | 32          | U         | 150 | 32  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Bromomethane  | 47          | U         | 150 | 47  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Carbon disulfide                                    | 32          | U *       | 150 | 32  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Carbon tetrachloride                                | 32          | U         | 150 | 32  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Chlorobenzene                                       | 16          | U         | 150 | 16  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Chlorodibromomethane                                | 19          | U         | 150 | 19  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Chloroform  | 30          | U         | 150 | 30  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Chloromethane                                       | 42          | U         | 150 | 42  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Chloroethane  | 22          | U         | 150 | 22  | ug/L |   |          | 07/22/15 15:56 | 30      |
| cis-1,2-Dichloroethene                              | 20          | U         | 150 | 20  | ug/L |   |          | 07/22/15 15:56 | 30      |
| cis-1,3-Dichloropropene                             | 22          | U         | 150 | 22  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Dichlorobromomethane                                | 28          | U         | 150 | 28  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Dichlorodifluoromethane                             | 19          | U         | 150 | 19  | ug/L |   |          | 07/22/15 15:56 | 30      |
| <b>Ethylbenzene</b>                                 | <b>38</b>   | <b>J</b>  | 150 | 19  | ug/L |   |          | 07/22/15 15:56 | 30      |
| 1,2-Dibromoethane                                   | 18          | U         | 150 | 18  | ug/L |   |          | 07/22/15 15:56 | 30      |
| <b>Cyclohexane</b>                                  | <b>40</b>   | <b>J</b>  | 150 | 18  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Isopropylbenzene                                    | 16          | U         | 150 | 16  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Methyl acetate                                      | 91          | U         | 750 | 91  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Methyl tert-butyl ether                             | 31          | U         | 150 | 31  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Methylcyclohexane                                   | 17          | U         | 150 | 17  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Methylene Chloride                                  | 33          | U *       | 150 | 33  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Styrene   | 19          | U         | 150 | 19  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Tetrachloroethene                                   | 25          | U         | 150 | 25  | ug/L |   |          | 07/22/15 15:56 | 30      |
| <b>Toluene</b>                                      | <b>1100</b> |           | 150 | 25  | ug/L |   |          | 07/22/15 15:56 | 30      |
| trans-1,2-Dichloroethene                            | 23          | U         | 150 | 23  | ug/L |   |          | 07/22/15 15:56 | 30      |
| trans-1,3-Dichloropropene                           | 17          | U         | 150 | 17  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Trichloroethene                                     | 24          | U         | 150 | 24  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Trichlorofluoromethane                              | 34          | U *       | 150 | 34  | ug/L |   |          | 07/22/15 15:56 | 30      |
| Vinyl chloride                                      | 39          | U         | 150 | 39  | ug/L |   |          | 07/22/15 15:56 | 30      |
| <b>Xylenes, Total</b>                               | <b>550</b>  |           | 300 | 50  | ug/L |   |          | 07/22/15 15:56 | 30      |

# Client Sample Results

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

Client Sample ID: MILEY EFFLUENT

Lab Sample ID: 180-46038-1

Date Collected: 07/17/15 15:00

Matrix: Water

Date Received: 07/17/15 18:20

| Surrogate                    | %Recovery | Qualifier | Limits   | Prepared | Analyzed       | Dil Fac |
|------------------------------|-----------|-----------|----------|----------|----------------|---------|
| 1,2-Dichloroethane-d4 (Surr) | 89        |           | 62 - 123 |          | 07/22/15 15:56 | 30      |
| 4-Bromofluorobenzene (Surr)  | 84        |           | 75 - 120 |          | 07/22/15 15:56 | 30      |
| Dibromofluoromethane (Surr)  | 107       |           | 80 - 120 |          | 07/22/15 15:56 | 30      |
| Toluene-d8 (Surr)            | 106       |           | 80 - 120 |          | 07/22/15 15:56 | 30      |

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

| Analyte                      | Result      | Qualifier | RL  | MDL  | Unit | D | Prepared       | Analyzed       | Dil Fac |
|------------------------------|-------------|-----------|-----|------|------|---|----------------|----------------|---------|
| Acenaphthene                 | 0.14        | U         | 1.9 | 0.14 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Acenaphthylene               | 0.14        | U         | 1.9 | 0.14 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Anthracene                   | 0.15        | U         | 1.9 | 0.15 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Benzo[a]anthracene           | 0.14        | U         | 1.9 | 0.14 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Benzo[a]pyrene               | 0.13        | U         | 1.9 | 0.13 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Benzo[b]fluoranthene         | 0.15        | U         | 1.9 | 0.15 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Benzo[g,h,i]perylene         | 0.14        | U         | 1.9 | 0.14 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Benzo[k]fluoranthene         | 0.52        | U         | 1.9 | 0.52 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Bis(2-ethylhexyl) phthalate  | 12          | U         | 19  | 12   | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 2,2'-oxybis[1-chloropropane] | 0.19        | U         | 1.9 | 0.19 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 4-Bromophenyl phenyl ether   | 0.60        | U         | 9.4 | 0.60 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Butyl benzyl phthalate       | 1.3         | U         | 9.4 | 1.3  | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Carbazole                    | 0.15        | U         | 1.9 | 0.15 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 4-Chloroaniline              | 0.83        | U         | 9.4 | 0.83 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 2-Chloronaphthalene          | 0.14        | U         | 1.9 | 0.14 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 4-Chlorophenyl phenyl ether  | 0.47        | U         | 9.4 | 0.47 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Chrysene                     | 0.13        | U         | 1.9 | 0.13 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Dibenz(a,h)anthracene        | 0.15        | U         | 1.9 | 0.15 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Dibenzofuran                 | 0.58        | U         | 9.4 | 0.58 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Di-n-butyl phthalate         | 1.2         | U         | 9.4 | 1.2  | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 3,3'-Dichlorobenzidine       | 1.1         | U         | 9.4 | 1.1  | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Diethyl phthalate            | 1.4         | U         | 9.4 | 1.4  | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Dimethyl phthalate           | 0.72        | U         | 9.4 | 0.72 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 2,4-Dinitrotoluene           | 0.51        | U         | 9.4 | 0.51 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 2,6-Dinitrotoluene           | 0.75        | U         | 9.4 | 0.75 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Di-n-octyl phthalate         | 1.9         | U         | 9.4 | 1.9  | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Fluoranthene                 | 0.15        | U         | 1.9 | 0.15 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Fluorene                     | 0.20        | U         | 1.9 | 0.20 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Hexachlorobenzene            | 0.17        | U         | 1.9 | 0.17 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Hexachlorobutadiene          | 0.16        | U         | 1.9 | 0.16 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Hexachlorocyclopentadiene    | 0.49        | U         | 9.4 | 0.49 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Hexachloroethane             | 0.59        | U         | 9.4 | 0.59 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Indeno[1,2,3-cd]pyrene       | 0.19        | U         | 1.9 | 0.19 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Isophorone                   | 0.61        | U         | 9.4 | 0.61 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| <b>2-Methylnaphthalene</b>   | <b>0.77</b> | <b>J</b>  | 1.9 | 0.12 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| <b>Naphthalene</b>           | <b>1.3</b>  | <b>J</b>  | 1.9 | 0.13 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 2-Nitroaniline               | 3.3         | U         | 47  | 3.3  | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 3-Nitroaniline               | 3.0         | U         | 47  | 3.0  | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 4-Nitroaniline               | 1.6         | U         | 47  | 1.6  | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| 4-Nitrophenol                | 6.1         | U         | 47  | 6.1  | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| Nitrobenzene                 | 0.80        | U         | 19  | 0.80 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| N-Nitrosodi-n-propylamine    | 0.29        | U         | 1.9 | 0.29 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |
| N-Nitrosodiphenylamine       | 0.80        | U         | 9.4 | 0.80 | ug/L |   | 07/22/15 09:14 | 07/23/15 10:53 | 1       |

TestAmerica Pittsburgh

# Client Sample Results

Client: Shalewater Solutions, LLC  
 Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

Client Sample ID: MILEY EFFLUENT

Lab Sample ID: 180-46038-1

Date Collected: 07/17/15 15:00

Matrix: Water

Date Received: 07/17/15 18:20

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

| Analyte                        | Result           | Qualifier        | RL            | MDL  | Unit | D | Prepared        | Analyzed        | Dil Fac        |
|--------------------------------|------------------|------------------|---------------|------|------|---|-----------------|-----------------|----------------|
| Phenanthrene                   | 0.40             | U                | 1.9           | 0.40 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| Pyrene                         | 0.15             | U                | 1.9           | 0.15 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 4-Chloro-3-methylphenol        | 0.71             | U                | 9.4           | 0.71 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 2-Chlorophenol                 | 1.6              | U                | 9.4           | 1.6  | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| <b>2-Methylphenol</b>          | <b>16</b>        |                  | 9.4           | 0.81 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| <b>Methylphenol, 3 &amp; 4</b> | <b>34</b>        |                  | 9.4           | 0.85 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 2,4-Dichlorophenol             | 0.32             | U                | 1.9           | 0.32 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| <b>2,4-Dimethylphenol</b>      | <b>6.8</b>       | <b>J</b>         | 9.4           | 0.80 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 2,4-Dinitrophenol              | 5.8              | U                | 47            | 5.8  | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 4,6-Dinitro-2-methylphenol     | 2.1              | U                | 47            | 2.1  | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 2-Nitrophenol                  | 1.6              | U                | 9.4           | 1.6  | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| Pentachlorophenol              | 0.63             | U                | 9.4           | 0.63 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| <b>Phenol</b>                  | <b>26</b>        |                  | 1.9           | 0.55 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 2,4,5-Trichlorophenol          | 1.4              | U                | 9.4           | 1.4  | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 2,4,6-Trichlorophenol          | 1.7              | U                | 9.4           | 1.7  | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| Acetophenone                   | 0.75             | U                | 9.4           | 0.75 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| Atrazine                       | 0.84             | U                | 9.4           | 0.84 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| Benzaldehyde                   | 1.4              | U                | 9.4           | 1.4  | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 1,1'-Biphenyl                  | 0.39             | U                | 9.4           | 0.39 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| Caprolactam                    | 11               | U                | 47            | 11   | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| Bis(2-chloroethoxy)methane     | 0.55             | U                | 9.4           | 0.55 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| Bis(2-chloroethyl)ether        | 0.24             | U                | 1.9           | 0.24 | ug/L |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| <b>Surrogate</b>               | <b>%Recovery</b> | <b>Qualifier</b> | <b>Limits</b> |      |      |   | <b>Prepared</b> | <b>Analyzed</b> | <b>Dil Fac</b> |
| Nitrobenzene-d5 (Surr)         | 71               |                  | 36 - 100      |      |      |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| Phenol-d5 (Surr)               | 57               |                  | 32 - 100      |      |      |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 2-Fluorobiphenyl               | 64               |                  | 38 - 100      |      |      |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 2,4,6-Tribromophenol (Surr)    | 64               |                  | 34 - 110      |      |      |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| 2-Fluorophenol (Surr)          | 60               |                  | 20 - 100      |      |      |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |
| Terphenyl-d14 (Surr)           | 13               | X                | 20 - 114      |      |      |   | 07/22/15 09:14  | 07/23/15 10:53  | 1              |

# QC Sample Results

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

## Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 180-148426/7  
Matrix: Water  
Analysis Batch: 148426

Client Sample ID: Method Blank  
Prep Type: Total/NA

| Analyte                               | MB MB  |           | RL  | MDL  | Unit | D | Prepared | Analyzed       | Dil Fac |
|---------------------------------------|--------|-----------|-----|------|------|---|----------|----------------|---------|
|                                       | Result | Qualifier |     |      |      |   |          |                |         |
| 1,1,1-Trichloroethane                 | 1.0    | U         | 5.0 | 1.0  | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,1,2,2-Tetrachloroethane             | 0.93   | U         | 5.0 | 0.93 | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 0.33   | U         | 5.0 | 0.33 | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,1,2-Trichloroethane                 | 1.2    | U         | 5.0 | 1.2  | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,1-Dichloroethane                    | 1.0    | U         | 5.0 | 1.0  | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,1-Dichloroethene                    | 1.1    | U         | 5.0 | 1.1  | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,2-Dibromo-3-Chloropropane           | 0.35   | U         | 5.0 | 0.35 | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,2-Dichlorobenzene                   | 0.68   | U         | 5.0 | 0.68 | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,2-Dichloroethane                    | 0.96   | U         | 5.0 | 0.96 | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,2-Dichloropropane                   | 1.3    | U         | 5.0 | 1.3  | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,2,4-Trichlorobenzene                | 0.38   | U         | 5.0 | 0.38 | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,3-Dichlorobenzene                   | 0.51   | U         | 5.0 | 0.51 | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,4-Dichlorobenzene                   | 0.53   | U         | 5.0 | 0.53 | ug/L |   |          | 07/22/15 11:50 | 1       |
| 2-Butanone (MEK)                      | 1.1    | U         | 5.0 | 1.1  | ug/L |   |          | 07/22/15 11:50 | 1       |
| 2-Hexanone                            | 0.57   | U         | 5.0 | 0.57 | ug/L |   |          | 07/22/15 11:50 | 1       |
| 4-Methyl-2-pentanone (MIBK)           | 0.59   | U         | 5.0 | 0.59 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Acetone                               | 5.0    | U         | 20  | 5.0  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Benzene                               | 0.99   | U         | 5.0 | 0.99 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Bromoform                             | 1.1    | U         | 5.0 | 1.1  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Bromomethane                          | 1.6    | U         | 5.0 | 1.6  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Carbon disulfide                      | 1.1    | U         | 5.0 | 1.1  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Carbon tetrachloride                  | 1.1    | U         | 5.0 | 1.1  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Chlorobenzene                         | 0.53   | U         | 5.0 | 0.53 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Chlorodibromomethane                  | 0.65   | U         | 5.0 | 0.65 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Chloroform                            | 1.0    | U         | 5.0 | 1.0  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Chloromethane                         | 1.4    | U         | 5.0 | 1.4  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Chloroethane                          | 0.75   | U         | 5.0 | 0.75 | ug/L |   |          | 07/22/15 11:50 | 1       |
| cis-1,2-Dichloroethene                | 0.67   | U         | 5.0 | 0.67 | ug/L |   |          | 07/22/15 11:50 | 1       |
| cis-1,3-Dichloropropene               | 0.73   | U         | 5.0 | 0.73 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Dichlorobromomethane                  | 0.93   | U         | 5.0 | 0.93 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Dichlorodifluoromethane               | 0.64   | U         | 5.0 | 0.64 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Ethylbenzene                          | 0.62   | U         | 5.0 | 0.62 | ug/L |   |          | 07/22/15 11:50 | 1       |
| 1,2-Dibromoethane                     | 0.61   | U         | 5.0 | 0.61 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Cyclohexane                           | 0.60   | U         | 5.0 | 0.60 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Isopropylbenzene                      | 0.53   | U         | 5.0 | 0.53 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Methyl acetate                        | 3.0    | U         | 25  | 3.0  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Methyl tert-butyl ether               | 1.0    | U         | 5.0 | 1.0  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Methylcyclohexane                     | 0.56   | U         | 5.0 | 0.56 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Methylene Chloride                    | 1.1    | U         | 5.0 | 1.1  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Styrene                               | 0.64   | U         | 5.0 | 0.64 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Tetrachloroethene                     | 0.82   | U         | 5.0 | 0.82 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Toluene                               | 0.85   | U         | 5.0 | 0.85 | ug/L |   |          | 07/22/15 11:50 | 1       |
| trans-1,2-Dichloroethene              | 0.75   | U         | 5.0 | 0.75 | ug/L |   |          | 07/22/15 11:50 | 1       |
| trans-1,3-Dichloropropene             | 0.58   | U         | 5.0 | 0.58 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Trichloroethene                       | 0.80   | U         | 5.0 | 0.80 | ug/L |   |          | 07/22/15 11:50 | 1       |
| Trichlorofluoromethane                | 1.1    | U         | 5.0 | 1.1  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Vinyl chloride                        | 1.3    | U         | 5.0 | 1.3  | ug/L |   |          | 07/22/15 11:50 | 1       |
| Xylenes, Total                        | 1.7    | U         | 10  | 1.7  | ug/L |   |          | 07/22/15 11:50 | 1       |

TestAmerica Pittsburgh

# QC Sample Results

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

| Surrogate                    | MB MB     |           | Limits   | Prepared | Analyzed       | Dil Fac |
|------------------------------|-----------|-----------|----------|----------|----------------|---------|
|                              | %Recovery | Qualifier |          |          |                |         |
| 1,2-Dichloroethane-d4 (Surr) | 83        |           | 62 - 123 |          | 07/22/15 11:50 | 1       |
| 4-Bromofluorobenzene (Surr)  | 83        |           | 75 - 120 |          | 07/22/15 11:50 | 1       |
| Dibromofluoromethane (Surr)  | 100       |           | 80 - 120 |          | 07/22/15 11:50 | 1       |
| Toluene-d8 (Surr)            | 106       |           | 80 - 120 |          | 07/22/15 11:50 | 1       |

Lab Sample ID: LCS 180-148426/4  
Matrix: Water  
Analysis Batch: 148426

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

| Analyte                               | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---------------------------------------|-------------|------------|---------------|------|---|------|--------------|
|                                       |             |            |               |      |   |      |              |
| 1,1,2,2-Tetrachloroethane             | 40.0        | 33.6       |               | ug/L |   | 84   | 59 - 136     |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 40.0        | 56.0       | *             | ug/L |   | 140  | 70 - 131     |
| 1,1,2-Trichloroethane                 | 40.0        | 35.3       |               | ug/L |   | 88   | 75 - 126     |
| 1,1-Dichloroethane                    | 40.0        | 31.1       |               | ug/L |   | 78   | 77 - 122     |
| 1,1-Dichloroethene                    | 40.0        | 57.4       | *             | ug/L |   | 143  | 69 - 127     |
| 1,2-Dibromo-3-Chloropropane           | 40.0        | 32.0       |               | ug/L |   | 80   | 28 - 150     |
| 1,2-Dichlorobenzene                   | 40.0        | 36.8       |               | ug/L |   | 92   | 75 - 125     |
| 1,2-Dichloroethane                    | 40.0        | 37.9       |               | ug/L |   | 95   | 63 - 140     |
| 1,2-Dichloropropane                   | 40.0        | 30.9       |               | ug/L |   | 77   | 75 - 114     |
| 1,2,4-Trichlorobenzene                | 40.0        | 29.2       |               | ug/L |   | 73   | 35 - 150     |
| 1,3-Dichlorobenzene                   | 40.0        | 38.0       |               | ug/L |   | 95   | 76 - 125     |
| 1,4-Dichlorobenzene                   | 40.0        | 36.6       |               | ug/L |   | 92   | 76 - 123     |
| 2-Butanone (MEK)                      | 40.0        | 46.2       |               | ug/L |   | 116  | 31 - 139     |
| 2-Hexanone                            | 40.0        | 47.0       |               | ug/L |   | 118  | 35 - 129     |
| 4-Methyl-2-pentanone (MIBK)           | 40.0        | 32.7       |               | ug/L |   | 82   | 33 - 135     |
| Acetone                               | 40.0        | 82.5       | *             | ug/L |   | 206  | 10 - 141     |
| Benzene                               | 40.0        | 33.4       |               | ug/L |   | 84   | 80 - 120     |
| Bromoform                             | 40.0        | 44.1       |               | ug/L |   | 110  | 49 - 137     |
| Bromomethane                          | 40.0        | 48.9       |               | ug/L |   | 122  | 45 - 150     |
| Carbon disulfide                      | 40.0        | 54.6       | *             | ug/L |   | 136  | 62 - 126     |
| Carbon tetrachloride                  | 40.0        | 41.4       |               | ug/L |   | 103  | 63 - 139     |
| Chlorobenzene                         | 40.0        | 37.1       |               | ug/L |   | 93   | 83 - 120     |
| Chlorodibromomethane                  | 40.0        | 40.8       |               | ug/L |   | 102  | 64 - 124     |
| Chloroform                            | 40.0        | 37.1       |               | ug/L |   | 93   | 77 - 119     |
| Chloromethane                         | 40.0        | 26.3       |               | ug/L |   | 66   | 49 - 133     |
| Chloroethane                          | 40.0        | 49.3       |               | ug/L |   | 123  | 33 - 150     |
| cis-1,2-Dichloroethene                | 40.0        | 36.0       |               | ug/L |   | 90   | 82 - 116     |
| cis-1,3-Dichloropropene               | 40.0        | 35.9       |               | ug/L |   | 90   | 74 - 123     |
| Dichlorobromomethane                  | 40.0        | 40.7       |               | ug/L |   | 102  | 71 - 119     |
| Dichlorodifluoromethane               | 40.0        | 43.7       |               | ug/L |   | 109  | 28 - 140     |
| Ethylbenzene                          | 40.0        | 36.3       |               | ug/L |   | 91   | 79 - 124     |
| 1,2-Dibromoethane                     | 40.0        | 38.4       |               | ug/L |   | 96   | 57 - 124     |
| Cyclohexane                           | 40.0        | 30.4       |               | ug/L |   | 76   | 69 - 124     |
| Isopropylbenzene                      | 40.0        | 35.6       |               | ug/L |   | 89   | 73 - 130     |
| Methyl acetate                        | 200         | 214        |               | ug/L |   | 107  | 34 - 127     |
| Methyl tert-butyl ether               | 40.0        | 31.9       |               | ug/L |   | 80   | 53 - 122     |
| Methylcyclohexane                     | 40.0        | 34.8       |               | ug/L |   | 87   | 67 - 120     |
| Methylene Chloride                    | 40.0        | 49.0       | *             | ug/L |   | 122  | 75 - 120     |
| m-Xylene & p-Xylene                   | 40.0        | 36.5       |               | ug/L |   | 91   | 78 - 124     |
| o-Xylene                              | 40.0        | 36.9       |               | ug/L |   | 92   | 78 - 124     |
| Styrene                               | 40.0        | 36.3       |               | ug/L |   | 91   | 78 - 124     |
| Tetrachloroethene                     | 40.0        | 37.8       |               | ug/L |   | 95   | 78 - 126     |

TestAmerica Pittsburgh

# QC Sample Results

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 180-148426/4

Matrix: Water

Analysis Batch: 148426

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

| Analyte                   | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---------------------------|-------------|------------|---------------|------|---|------|--------------|
| Toluene                   | 40.0        | 33.1       |               | ug/L |   | 83   | 80 - 124     |
| trans-1,2-Dichloroethene  | 40.0        | 35.3       |               | ug/L |   | 88   | 78 - 120     |
| trans-1,3-Dichloropropene | 40.0        | 33.6       |               | ug/L |   | 84   | 63 - 122     |
| Trichloroethene           | 40.0        | 38.6       |               | ug/L |   | 96   | 80 - 120     |
| Trichlorofluoromethane    | 40.0        | 40.7       |               | ug/L |   | 102  | 14 - 150     |
| Vinyl chloride            | 40.0        | 40.5       |               | ug/L |   | 101  | 57 - 128     |
| Xylenes, Total            | 80.0        | 73.4       |               | ug/L |   | 92   | 81 - 121     |

| Surrogate                    | LCS %Recovery | LCS Qualifier | Limits   |
|------------------------------|---------------|---------------|----------|
| 1,2-Dichloroethane-d4 (Surr) | 99            |               | 62 - 123 |
| 4-Bromofluorobenzene (Surr)  | 90            |               | 75 - 120 |
| Dibromofluoromethane (Surr)  | 100           |               | 80 - 120 |
| Toluene-d8 (Surr)            | 88            |               | 80 - 120 |

Lab Sample ID: LCSD 180-148426/5

Matrix: Water

Analysis Batch: 148426

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

| Analyte                               | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | Limit |
|---------------------------------------|-------------|-------------|----------------|------|---|------|--------------|-----|-------|
| 1,1,1-Trichloroethane                 | 40.0        | 36.9        |                | ug/L |   | 92   | 69 - 134     | 11  | 24    |
| 1,1,1,2-Tetrachloroethane             | 40.0        | 37.5        |                | ug/L |   | 94   | 59 - 136     | 11  | 20    |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 40.0        | 55.8        | *              | ug/L |   | 140  | 70 - 131     | 0   | 30    |
| 1,1,2-Trichloroethane                 | 40.0        | 38.4        |                | ug/L |   | 96   | 75 - 126     | 8   | 23    |
| 1,1-Dichloroethane                    | 40.0        | 33.7        |                | ug/L |   | 84   | 77 - 122     | 8   | 22    |
| 1,1-Dichloroethene                    | 40.0        | 57.3        | *              | ug/L |   | 143  | 69 - 127     | 0   | 20    |
| 1,2-Dibromo-3-Chloropropane           | 40.0        | 44.2        | *              | ug/L |   | 111  | 28 - 150     | 32  | 20    |
| 1,2-Dichlorobenzene                   | 40.0        | 40.2        |                | ug/L |   | 100  | 75 - 125     | 9   | 20    |
| 1,2-Dichloroethane                    | 40.0        | 40.0        |                | ug/L |   | 100  | 63 - 140     | 5   | 25    |
| 1,2-Dichloropropane                   | 40.0        | 32.6        |                | ug/L |   | 82   | 75 - 114     | 5   | 20    |
| 1,2,4-Trichlorobenzene                | 40.0        | 33.2        |                | ug/L |   | 83   | 35 - 150     | 13  | 30    |
| 1,3-Dichlorobenzene                   | 40.0        | 40.5        |                | ug/L |   | 101  | 76 - 125     | 6   | 21    |
| 1,4-Dichlorobenzene                   | 40.0        | 39.0        |                | ug/L |   | 98   | 76 - 123     | 6   | 20    |
| 2-Butanone (MEK)                      | 40.0        | 53.3        |                | ug/L |   | 133  | 31 - 139     | 14  | 35    |
| 2-Hexanone                            | 40.0        | 52.5        | *              | ug/L |   | 131  | 35 - 129     | 11  | 24    |
| 4-Methyl-2-pentanone (MIBK)           | 40.0        | 34.6        |                | ug/L |   | 86   | 33 - 135     | 5   | 29    |
| Acetone                               | 40.0        | 87.3        | *              | ug/L |   | 218  | 10 - 141     | 6   | 32    |
| Benzene                               | 40.0        | 35.2        |                | ug/L |   | 88   | 80 - 120     | 5   | 20    |
| Bromoform                             | 40.0        | 46.7        |                | ug/L |   | 117  | 49 - 137     | 6   | 20    |
| Bromomethane                          | 40.0        | 44.7        |                | ug/L |   | 112  | 45 - 150     | 9   | 23    |
| Carbon disulfide                      | 40.0        | 54.2        | *              | ug/L |   | 136  | 62 - 126     | 1   | 20    |
| Carbon tetrachloride                  | 40.0        | 43.2        |                | ug/L |   | 108  | 63 - 139     | 4   | 25    |
| Chlorobenzene                         | 40.0        | 39.0        |                | ug/L |   | 98   | 83 - 120     | 5   | 20    |
| Chlorodibromomethane                  | 40.0        | 45.0        |                | ug/L |   | 112  | 64 - 124     | 10  | 20    |
| Chloroform                            | 40.0        | 39.8        |                | ug/L |   | 99   | 77 - 119     | 7   | 20    |
| Chloromethane                         | 40.0        | 26.4        |                | ug/L |   | 66   | 49 - 133     | 0   | 20    |
| Chloroethane                          | 40.0        | 47.1        |                | ug/L |   | 118  | 33 - 150     | 5   | 24    |
| cis-1,2-Dichloroethene                | 40.0        | 39.0        |                | ug/L |   | 98   | 82 - 116     | 8   | 20    |

TestAmerica Pittsburgh

# QC Sample Results

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 180-148426/5  
Matrix: Water  
Analysis Batch: 148426

Client Sample ID: Lab Control Sample Dup  
Prep Type: Total/NA

| Analyte                   | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---------------------------|-------------|-------------|----------------|------|---|------|--------------|-----|-----------|
|                           |             |             |                |      |   |      |              |     |           |
| cis-1,3-Dichloropropene   | 40.0        | 39.4        |                | ug/L |   | 99   | 74 - 123     | 9   | 20        |
| Dichlorobromomethane      | 40.0        | 42.1        |                | ug/L |   | 105  | 71 - 119     | 3   | 20        |
| Dichlorodifluoromethane   | 40.0        | 44.6        |                | ug/L |   | 111  | 28 - 140     | 2   | 20        |
| Ethylbenzene              | 40.0        | 37.9        |                | ug/L |   | 95   | 79 - 124     | 4   | 25        |
| 1,2-Dibromoethane         | 40.0        | 39.9        |                | ug/L |   | 100  | 57 - 124     | 4   | 20        |
| Cyclohexane               | 40.0        | 30.9        |                | ug/L |   | 77   | 69 - 124     | 2   | 20        |
| Isopropylbenzene          | 40.0        | 36.4        |                | ug/L |   | 91   | 73 - 130     | 2   | 20        |
| Methyl acetate            | 200         | 221         |                | ug/L |   | 110  | 34 - 127     | 3   | 29        |
| Methyl tert-butyl ether   | 40.0        | 34.0        |                | ug/L |   | 85   | 53 - 122     | 6   | 20        |
| Methylcyclohexane         | 40.0        | 36.4        |                | ug/L |   | 91   | 67 - 120     | 4   | 20        |
| Methylene Chloride        | 40.0        | 50.8 *      |                | ug/L |   | 127  | 75 - 120     | 4   | 20        |
| m-Xylene & p-Xylene       | 40.0        | 38.0        |                | ug/L |   | 95   | 78 - 124     | 4   | 24        |
| o-Xylene                  | 40.0        | 37.3        |                | ug/L |   | 93   | 78 - 124     | 1   | 22        |
| Styrene                   | 40.0        | 37.7        |                | ug/L |   | 94   | 78 - 124     | 4   | 22        |
| Tetrachloroethene         | 40.0        | 40.5        |                | ug/L |   | 101  | 78 - 126     | 7   | 25        |
| Toluene                   | 40.0        | 34.4        |                | ug/L |   | 86   | 80 - 124     | 4   | 20        |
| trans-1,2-Dichloroethene  | 40.0        | 41.2        |                | ug/L |   | 103  | 78 - 120     | 15  | 20        |
| trans-1,3-Dichloropropene | 40.0        | 36.1        |                | ug/L |   | 90   | 63 - 122     | 7   | 20        |
| Trichloroethene           | 40.0        | 40.5        |                | ug/L |   | 101  | 80 - 120     | 5   | 20        |
| Trichlorofluoromethane    | 40.0        | 54.8 *      |                | ug/L |   | 137  | 14 - 150     | 30  | 20        |
| Vinyl chloride            | 40.0        | 51.0        |                | ug/L |   | 127  | 57 - 128     | 23  | 26        |
| Xylenes, Total            | 80.0        | 75.3        |                | ug/L |   | 94   | 81 - 121     | 3   | 20        |

| Surrogate                    | LCSD %Recovery | LCSD Qualifier | Limits   |
|------------------------------|----------------|----------------|----------|
| 1,2-Dichloroethane-d4 (Surr) | 103            |                | 62 - 123 |
| 4-Bromofluorobenzene (Surr)  | 93             |                | 75 - 120 |
| Dibromofluoromethane (Surr)  | 101            |                | 80 - 120 |
| Toluene-d8 (Surr)            | 90             |                | 80 - 120 |

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: LCS 180-148449/2-A  
Matrix: Water  
Analysis Batch: 148562

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 148449

| Analyte                      | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|------------------------------|-------------|------------|---------------|------|---|------|--------------|
|                              |             |            |               |      |   |      |              |
| Acenaphthene                 | 200         | 141        |               | ug/L |   | 71   | 46 - 100     |
| Acenaphthylene               | 200         | 149        |               | ug/L |   | 74   | 40 - 100     |
| Anthracene                   | 200         | 167        |               | ug/L |   | 83   | 46 - 100     |
| Benzo[a]anthracene           | 200         | 155        |               | ug/L |   | 77   | 40 - 103     |
| Benzo[a]pyrene               | 200         | 161        |               | ug/L |   | 81   | 45 - 100     |
| Benzo[b]fluoranthene         | 200         | 154        |               | ug/L |   | 77   | 35 - 100     |
| Benzo[g,h,i]perylene         | 200         | 192        |               | ug/L |   | 96   | 46 - 100     |
| Benzo[k]fluoranthene         | 200         | 152        |               | ug/L |   | 76   | 43 - 100     |
| Bis(2-ethylhexyl) phthalate  | 200         | 167        |               | ug/L |   | 84   | 35 - 112     |
| 2,2'-oxybis[1-chloropropane] | 200         | 119        |               | ug/L |   | 60   | 30 - 100     |
| 4-Bromophenyl phenyl ether   | 200         | 163        |               | ug/L |   | 82   | 46 - 100     |
| Butyl benzyl phthalate       | 200         | 157        |               | ug/L |   | 78   | 34 - 110     |

TestAmerica Pittsburgh

# QC Sample Results

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 180-148449/2-A

Matrix: Water

Analysis Batch: 148562

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 148449

| Analyte                     | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | Limits   |
|-----------------------------|-------------|------------|---------------|------|---|------|----------|
|                             |             |            |               |      |   |      |          |
| Carbazole                   | 200         | 171        |               | ug/L |   | 86   | 44 - 100 |
| 4-Chloroaniline             | 200         | 127        |               | ug/L |   | 64   | 43 - 100 |
| 2-Chloronaphthalene         | 200         | 149        |               | ug/L |   | 74   | 37 - 100 |
| 4-Chlorophenyl phenyl ether | 200         | 152        |               | ug/L |   | 76   | 46 - 100 |
| Chrysene                    | 200         | 164        |               | ug/L |   | 82   | 47 - 100 |
| Dibenz(a,h)anthracene       | 200         | 195        |               | ug/L |   | 97   | 46 - 100 |
| Dibenzofuran                | 200         | 150        |               | ug/L |   | 75   | 43 - 100 |
| Di-n-butyl phthalate        | 200         | 175        |               | ug/L |   | 88   | 43 - 101 |
| 3,3'-Dichlorobenzidine      | 200         | 154        |               | ug/L |   | 77   | 36 - 100 |
| Diethyl phthalate           | 200         | 166        |               | ug/L |   | 83   | 42 - 100 |
| Dimethyl phthalate          | 200         | 160        |               | ug/L |   | 80   | 44 - 100 |
| 2,4-Dinitrotoluene          | 200         | 176        |               | ug/L |   | 88   | 48 - 100 |
| 2,6-Dinitrotoluene          | 200         | 163        |               | ug/L |   | 81   | 47 - 100 |
| Di-n-octyl phthalate        | 200         | 152        |               | ug/L |   | 76   | 30 - 109 |
| Fluoranthene                | 200         | 173        |               | ug/L |   | 86   | 44 - 100 |
| Fluorene                    | 200         | 154        |               | ug/L |   | 77   | 44 - 100 |
| Hexachlorobenzene           | 200         | 153        |               | ug/L |   | 76   | 16 - 115 |
| Hexachlorobutadiene         | 200         | 141        |               | ug/L |   | 70   | 15 - 110 |
| Hexachlorocyclopentadiene   | 200         | 71.7       |               | ug/L |   | 36   | 19 - 116 |
| Hexachloroethane            | 200         | 134        |               | ug/L |   | 67   | 41 - 100 |
| Indeno[1,2,3-cd]pyrene      | 200         | 190        |               | ug/L |   | 95   | 46 - 100 |
| Isophorone                  | 200         | 144        |               | ug/L |   | 72   | 47 - 100 |
| 2-Methylnaphthalene         | 200         | 143        |               | ug/L |   | 72   | 44 - 100 |
| Naphthalene                 | 200         | 134        |               | ug/L |   | 67   | 44 - 100 |
| 2-Nitroaniline              | 200         | 177        |               | ug/L |   | 89   | 46 - 103 |
| 3-Nitroaniline              | 200         | 171        |               | ug/L |   | 85   | 41 - 100 |
| 4-Nitroaniline              | 200         | 175        |               | ug/L |   | 88   | 41 - 103 |
| 4-Nitrophenol               | 400         | 401        |               | ug/L |   | 100  | 22 - 135 |
| Nitrobenzene                | 200         | 150        |               | ug/L |   | 75   | 37 - 100 |
| N-Nitrosodi-n-propylamine   | 200         | 129        |               | ug/L |   | 64   | 43 - 100 |
| N-Nitrosodiphenylamine      | 400         | 317        |               | ug/L |   | 79   | 13 - 133 |
| Phenanthrene                | 200         | 161        |               | ug/L |   | 80   | 45 - 100 |
| Pyrene                      | 200         | 146        |               | ug/L |   | 73   | 35 - 105 |
| 4-Chloro-3-methylphenol     | 200         | 152        |               | ug/L |   | 76   | 45 - 100 |
| 2-Chlorophenol              | 200         | 128        |               | ug/L |   | 64   | 18 - 103 |
| 2-Methylphenol              | 200         | 123        |               | ug/L |   | 62   | 42 - 100 |
| Methylphenol, 3 & 4         | 200         | 130        |               | ug/L |   | 65   | 41 - 100 |
| 2,4-Dichlorophenol          | 200         | 140        |               | ug/L |   | 70   | 26 - 104 |
| 2,4-Dimethylphenol          | 200         | 136        |               | ug/L |   | 68   | 37 - 100 |
| 2,4-Dinitrophenol           | 400         | 280        |               | ug/L |   | 70   | 37 - 100 |
| 4,6-Dinitro-2-methylphenol  | 400         | 347        |               | ug/L |   | 87   | 45 - 100 |
| 2-Nitrophenol               | 200         | 141        |               | ug/L |   | 71   | 42 - 100 |
| Pentachlorophenol           | 400         | 321        |               | ug/L |   | 80   | 30 - 105 |
| Phenol                      | 200         | 111        |               | ug/L |   | 56   | 19 - 103 |
| 2,4,5-Trichlorophenol       | 200         | 158        |               | ug/L |   | 79   | 23 - 114 |
| 2,4,6-Trichlorophenol       | 200         | 155        |               | ug/L |   | 77   | 47 - 100 |
| Acetophenone                | 200         | 138        |               | ug/L |   | 69   | 40 - 100 |
| Atrazine                    | 200         | 168        |               | ug/L |   | 84   | 30 - 130 |

TestAmerica Pittsburgh

# QC Sample Results

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 180-148449/2-A

Matrix: Water

Analysis Batch: 148562

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 148449

| Analyte                    | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | Limits   |
|----------------------------|-------------|------------|---------------|------|---|------|----------|
| Benzaldehyde               | 200         | 175        |               | ug/L |   | 88   | 10 - 117 |
| 1,1'-Biphenyl              | 200         | 144        |               | ug/L |   | 72   | 43 - 100 |
| Caprolactam                | 200         | 91.0       |               | ug/L |   | 45   | 24 - 114 |
| Bis(2-chloroethoxy)methane | 200         | 136        |               | ug/L |   | 68   | 44 - 100 |
| Bis(2-chloroethyl)ether    | 200         | 124        |               | ug/L |   | 62   | 41 - 100 |

| Surrogate                   | LCS %Recovery | LCS Qualifier | Limits   |
|-----------------------------|---------------|---------------|----------|
| Nitrobenzene-d5 (Surr)      | 74            |               | 36 - 100 |
| Phenol-d5 (Surr)            | 56            |               | 32 - 100 |
| 2-Fluorobiphenyl            | 72            |               | 38 - 100 |
| 2,4,6-Tribromophenol (Surr) | 81            |               | 34 - 110 |
| 2-Fluorophenol (Surr)       | 62            |               | 20 - 100 |
| Terphenyl-d14 (Surr)        | 43            |               | 20 - 114 |

Lab Sample ID: LCSD 180-148449/3-A

Matrix: Water

Analysis Batch: 148562

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 148449

| Analyte                      | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | Limits   | RPD | Limit |
|------------------------------|-------------|-------------|----------------|------|---|------|----------|-----|-------|
| Acenaphthene                 | 200         | 140         |                | ug/L |   | 70   | 46 - 100 | 1   | 15    |
| Acenaphthylene               | 200         | 151         |                | ug/L |   | 76   | 40 - 100 | 2   | 15    |
| Anthracene                   | 200         | 158         |                | ug/L |   | 79   | 46 - 100 | 5   | 15    |
| Benzo[a]anthracene           | 200         | 159         |                | ug/L |   | 79   | 40 - 103 | 2   | 15    |
| Benzo[a]pyrene               | 200         | 155         |                | ug/L |   | 78   | 45 - 100 | 4   | 15    |
| Benzo[b]fluoranthene         | 200         | 140         |                | ug/L |   | 70   | 35 - 100 | 9   | 15    |
| Benzo[g,h,i]perylene         | 200         | 182         |                | ug/L |   | 91   | 46 - 100 | 6   | 15    |
| Benzo[k]fluoranthene         | 200         | 145         |                | ug/L |   | 73   | 43 - 100 | 5   | 15    |
| Bis(2-ethylhexyl) phthalate  | 200         | 176         |                | ug/L |   | 88   | 35 - 112 | 5   | 15    |
| 2,2'-oxybis[1-chloropropane] | 200         | 116         |                | ug/L |   | 58   | 30 - 100 | 3   | 15    |
| 4-Bromophenyl phenyl ether   | 200         | 159         |                | ug/L |   | 80   | 46 - 100 | 2   | 15    |
| Butyl benzyl phthalate       | 200         | 166         |                | ug/L |   | 83   | 34 - 110 | 6   | 15    |
| Carbazole                    | 200         | 166         |                | ug/L |   | 83   | 44 - 100 | 3   | 15    |
| 4-Chloroaniline              | 200         | 128         |                | ug/L |   | 64   | 43 - 100 | 1   | 15    |
| 2-Chloronaphthalene          | 200         | 148         |                | ug/L |   | 74   | 37 - 100 | 1   | 15    |
| 4-Chlorophenyl phenyl ether  | 200         | 152         |                | ug/L |   | 76   | 46 - 100 | 0   | 15    |
| Chrysene                     | 200         | 164         |                | ug/L |   | 82   | 47 - 100 | 0   | 15    |
| Dibenz(a,h)anthracene        | 200         | 188         |                | ug/L |   | 94   | 46 - 100 | 4   | 15    |
| Dibenzofuran                 | 200         | 149         |                | ug/L |   | 74   | 43 - 100 | 1   | 15    |
| Di-n-butyl phthalate         | 200         | 173         |                | ug/L |   | 87   | 43 - 101 | 1   | 15    |
| 3,3'-Dichlorobenzidine       | 200         | 172         |                | ug/L |   | 86   | 36 - 100 | 11  | 14    |
| Diethyl phthalate            | 200         | 163         |                | ug/L |   | 81   | 42 - 100 | 2   | 15    |
| Dimethyl phthalate           | 200         | 160         |                | ug/L |   | 80   | 44 - 100 | 0   | 15    |
| 2,4-Dinitrotoluene           | 200         | 176         |                | ug/L |   | 88   | 48 - 100 | 0   | 15    |
| 2,6-Dinitrotoluene           | 200         | 161         |                | ug/L |   | 81   | 47 - 100 | 1   | 15    |
| Di-n-octyl phthalate         | 200         | 158         |                | ug/L |   | 79   | 30 - 109 | 3   | 15    |
| Fluoranthene                 | 200         | 173         |                | ug/L |   | 87   | 44 - 100 | 0   | 15    |
| Fluorene                     | 200         | 152         |                | ug/L |   | 76   | 44 - 100 | 2   | 15    |
| Hexachlorobenzene            | 200         | 155         |                | ug/L |   | 78   | 16 - 115 | 2   | 15    |

TestAmerica Pittsburgh

# QC Sample Results

Client: Shalewater Solutions, LLC  
Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 180-148449/3-A

Matrix: Water

Analysis Batch: 148562

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 148449

| Analyte                    | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD   |
|----------------------------|-------------|-------------|----------------|------|---|------|--------------|-----|-------|
|                            |             |             |                |      |   |      |              |     | Limit |
| Hexachlorobutadiene        | 200         | 148         |                | ug/L |   | 74   | 15 - 110     | 5   | 16    |
| Hexachlorocyclopentadiene  | 200         | 75.5        |                | ug/L |   | 38   | 19 - 116     | 5   | 15    |
| Hexachloroethane           | 200         | 129         |                | ug/L |   | 64   | 41 - 100     | 4   | 15    |
| Indeno[1,2,3-cd]pyrene     | 200         | 183         |                | ug/L |   | 92   | 46 - 100     | 3   | 15    |
| Isophorone                 | 200         | 142         |                | ug/L |   | 71   | 47 - 100     | 1   | 15    |
| 2-Methylnaphthalene        | 200         | 141         |                | ug/L |   | 71   | 44 - 100     | 2   | 15    |
| Naphthalene                | 200         | 134         |                | ug/L |   | 67   | 44 - 100     | 0   | 15    |
| 2-Nitroaniline             | 200         | 180         |                | ug/L |   | 90   | 46 - 103     | 2   | 15    |
| 3-Nitroaniline             | 200         | 174         |                | ug/L |   | 87   | 41 - 100     | 2   | 15    |
| 4-Nitroaniline             | 200         | 179         |                | ug/L |   | 90   | 41 - 103     | 2   | 15    |
| 4-Nitrophenol              | 400         | 391         |                | ug/L |   | 98   | 22 - 135     | 3   | 16    |
| Nitrobenzene               | 200         | 152         |                | ug/L |   | 76   | 37 - 100     | 1   | 15    |
| N-Nitrosodi-n-propylamine  | 200         | 127         |                | ug/L |   | 64   | 43 - 100     | 1   | 15    |
| N-Nitrosodiphenylamine     | 400         | 311         |                | ug/L |   | 78   | 13 - 133     | 2   | 15    |
| Phenanthrene               | 200         | 153         |                | ug/L |   | 76   | 45 - 100     | 5   | 15    |
| Pyrene                     | 200         | 143         |                | ug/L |   | 72   | 35 - 105     | 2   | 15    |
| 4-Chloro-3-methylphenol    | 200         | 148         |                | ug/L |   | 74   | 45 - 100     | 3   | 15    |
| 2-Chlorophenol             | 200         | 126         |                | ug/L |   | 63   | 18 - 103     | 1   | 15    |
| 2-Methylphenol             | 200         | 122         |                | ug/L |   | 61   | 42 - 100     | 1   | 14    |
| Methylphenol, 3 & 4        | 200         | 126         |                | ug/L |   | 63   | 41 - 100     | 3   | 15    |
| 2,4-Dichlorophenol         | 200         | 142         |                | ug/L |   | 71   | 26 - 104     | 1   | 33    |
| 2,4-Dimethylphenol         | 200         | 135         |                | ug/L |   | 67   | 37 - 100     | 1   | 16    |
| 2,4-Dinitrophenol          | 400         | 310         |                | ug/L |   | 78   | 37 - 100     | 10  | 16    |
| 4,6-Dinitro-2-methylphenol | 400         | 359         |                | ug/L |   | 90   | 45 - 100     | 3   | 16    |
| 2-Nitrophenol              | 200         | 146         |                | ug/L |   | 73   | 42 - 100     | 3   | 18    |
| Pentachlorophenol          | 400         | 317         |                | ug/L |   | 79   | 30 - 105     | 1   | 16    |
| Phenol                     | 200         | 107         |                | ug/L |   | 53   | 19 - 103     | 4   | 15    |
| 2,4,5-Trichlorophenol      | 200         | 155         |                | ug/L |   | 78   | 23 - 114     | 2   | 15    |
| 2,4,6-Trichlorophenol      | 200         | 156         |                | ug/L |   | 78   | 47 - 100     | 1   | 15    |
| Acetophenone               | 200         | 136         |                | ug/L |   | 68   | 40 - 100     | 2   | 15    |
| Atrazine                   | 200         | 169         |                | ug/L |   | 84   | 30 - 130     | 0   | 15    |
| Benzaldehyde               | 200         | 174         |                | ug/L |   | 87   | 10 - 117     | 1   | 23    |
| 1,1'-Biphenyl              | 200         | 142         |                | ug/L |   | 71   | 43 - 100     | 2   | 15    |
| Caprolactam                | 200         | 97.3        |                | ug/L |   | 49   | 24 - 114     | 7   | 17    |
| Bis(2-chloroethoxy)methane | 200         | 132         |                | ug/L |   | 66   | 44 - 100     | 3   | 15    |
| Bis(2-chloroethyl)ether    | 200         | 121         |                | ug/L |   | 60   | 41 - 100     | 3   | 17    |

| Surrogate                   | LCSD      |           | Limits   |
|-----------------------------|-----------|-----------|----------|
|                             | %Recovery | Qualifier |          |
| Nitrobenzene-d5 (Surr)      | 73        |           | 36 - 100 |
| Phenol-d5 (Surr)            | 55        |           | 32 - 100 |
| 2-Fluorobiphenyl            | 72        |           | 38 - 100 |
| 2,4,6-Tribromophenol (Surr) | 79        |           | 34 - 110 |
| 2-Fluorophenol (Surr)       | 63        |           | 20 - 100 |
| Terphenyl-d14 (Surr)        | 43        |           | 20 - 114 |

TestAmerica Pittsburgh

## QC Association Summary

Client: Shalewater Solutions, LLC  
 Project/Site: Air Permit

TestAmerica Job ID: 180-46038-1

### GC/MS VOA

#### Analysis Batch: 148426

| Lab Sample ID     | Client Sample ID       | Prep Type | Matrix | Method | Prep Batch |
|-------------------|------------------------|-----------|--------|--------|------------|
| 180-46038-1       | MILEY EFFLUENT         | Total/NA  | Water  | 8260C  |            |
| LCS 180-148426/4  | Lab Control Sample     | Total/NA  | Water  | 8260C  |            |
| LCSD 180-148426/5 | Lab Control Sample Dup | Total/NA  | Water  | 8260C  |            |
| MB 180-148426/7   | Method Blank           | Total/NA  | Water  | 8260C  |            |

### GC/MS Semi VOA

#### Prep Batch: 148449

| Lab Sample ID       | Client Sample ID       | Prep Type | Matrix | Method | Prep Batch |
|---------------------|------------------------|-----------|--------|--------|------------|
| 180-46038-1         | MILEY EFFLUENT         | Total/NA  | Water  | 3520C  |            |
| LCS 180-148449/2-A  | Lab Control Sample     | Total/NA  | Water  | 3520C  |            |
| LCSD 180-148449/3-A | Lab Control Sample Dup | Total/NA  | Water  | 3520C  |            |

#### Analysis Batch: 148562

| Lab Sample ID       | Client Sample ID       | Prep Type | Matrix | Method | Prep Batch |
|---------------------|------------------------|-----------|--------|--------|------------|
| 180-46038-1         | MILEY EFFLUENT         | Total/NA  | Water  | 8270D  | 148449     |
| LCS 180-148449/2-A  | Lab Control Sample     | Total/NA  | Water  | 8270D  | 148449     |
| LCSD 180-148449/3-A | Lab Control Sample Dup | Total/NA  | Water  | 8270D  | 148449     |



## Login Sample Receipt Checklist

Client: Shalewater Solutions, LLC

Job Number: 180-46038-1

**Login Number: 46038**

**List Source: TestAmerica Pittsburgh**

**List Number: 1**

**Creator: Lonzo, Michael A**

| Question   | Answer | Comment |
|--|--------|---------|
| Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.      | True   |         |
| The cooler's custody seal, if present, is intact.  | True   |         |
| Sample custody seals, if present, are intact.  | True   |         |
| The cooler or samples do not appear to have been compromised or tampered with.           | True   |         |
| Samples were received on ice.  | True   |         |
| Cooler Temperature is acceptable.  | True   |         |
| Cooler Temperature is recorded.  | True   |         |
| COC is present.  | True   |         |
| COC is filled out in ink and legible.  | True   |         |
| COC is filled out with all pertinent information.  | True   |         |
| Is the Field Sampler's name present on COC?  | True   |         |
| There are no discrepancies between the containers received and the COC.                  | True   |         |
| Samples are received within Holding Time.  | True   |         |
| Sample containers have legible labels.   | True   |         |
| Containers are not broken or leaking.  | True   |         |
| Sample collection date/times are provided.   | True   |         |
| Appropriate sample containers are used.  | True   |         |
| Sample bottles are completely filled.  | True   |         |
| Sample Preservation Verified.  | True   |         |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs         | True   |         |
| Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4"). | True   |         |
| Multiphasic samples are not present.   | True   |         |
| Samples do not require splitting or compositing.   | True   |         |
| Residual Chlorine Checked.   | N/A    |         |





15185 Main Street  
Lemont, IL 60439  
630-257-3900

Distributed By:  
SAL Chemical  
3036 Birch Drive  
Weirton, WV 26062  
304-748-8200

# Material Safety Data Sheet

## 15% - 30 % Caustic Soda

### Section 1: Product Identification

|   |  |
|---|--|
| <b>PRODUCT NAME</b><br>15-30% Caustic Soda - Liquid | <b>REVISION DATE</b><br>March 14, 2006 |
| <b>SYNONYM</b><br>Sodium Hydroxide Solution         | <b>ID NUMBER</b><br>UN 1824            |
| <b>CHEMICAL FORMULA</b><br>NaOH                     | <b>CAS NUMBER</b><br>1310-73-2         |

#### EMERGENCY NUMBERS

24 Hour Emergency : CHEMTREC 1-800-424-9300  
Product Information: Lemont, IL 1-630-257-3900

### Section 2: Physical Data & Ingredients

|  |  |
|--|--|
| <b>APPEARANCE</b><br>Colorless to slightly grey solution | <b>ODOR</b><br>Virtually Odorless              |
| <b>VAPOR PRESSURE</b><br>1 mm Hg. @ 68° F ( 20° C)       | <b>BOILING POINT</b><br>222 -240° F            |
| <b>SPECIFIC GRAVITY</b><br>1.16 - 1.33 @ 60° F           | <b>SOLUBILITY</b><br>Complete in water         |
| <b>DENSITY</b><br>9.67 - 11.11 lbs/gal @ 60 °F.          | <b>pH OF SOLUTIONS</b><br>Strongly Basic ( 14) |
| <b>HEAT OF SOLUTION</b><br>Exothermic                    |  |

|                              |                   |
|------------------------------|-------------------|
| <b>INGREDIENTS</b>           | <b>%</b>          |
| Materials : Sodium Hydroxide | Approx. 15 - 30 % |
| Water                        | Balance           |

### Section 3: Fire & Explosion Information

|   |                              |
|---|------------------------------|
| <b>FIRE EXTINGUISHING MEDIA</b><br>Not Applicable | <b>FIRE</b><br>Not Flammable |
|---|------------------------------|

**EXPLOSION** - Contact with some metals, particularly magnesium, aluminum and zinc ( galvanized), can generate hydrogen rapidly, which is explosive.

### Section 4: Reactivity Data

**STABILITY** - Stable under ordinary conditions of use and storage.

**HAZARDOUS DECOMPOSITION PRODUCTS** - Reaction with various food sugars may form carbon monoxide.

**HAZARDOUS POLYMERIZATION** - This substance does not polymerize.

**INCOMPATIBILITY: ( MATERIALS TO AVOID)** - May react violently with water, acids and a number of organic compounds. Reacts rapidly with aluminum, tin and zinc. Also reacts with bronze and brass.

### Section 5: Leak, Spill, Disposal Information

#### STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED

Dike area to contain spill. Only trained personnel equipped with NIOSH/MSHA approved, full face combination dust/mist respirators should be permitted in this area. Reclaim spilled material if possible or dilute material with a large quantity of water, then neutralize with dilute acid. Properly neutralize liquid residues ( pH 6-9 ) may be disposed of in waste water treatment facilities which allow the discharge of neutral salt solutions. Neutralized material can be recovered by vacuum truck for disposal. After all visible traces have been removed, flush area with large amounts of water.

#### WASTE DISPOSAL METHOD

Dispose of neutralized material in an approved hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of chemical materials and/or their containers in accordance with all federal, state and local regulations.

### Section 6: Health & Hazard Data

IS CHEMICAL LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN?

NTP - NO IARC - NO OSHA - NO

MEDICAL CONDITION GENERALLY AGGRAVATED  
BY EXPOSURE: None Known

PERMISSIBLE EXPOSURE LIMIT -OSHA 2mg./m<sup>3</sup> ceiling

## **ACUTE TOXICITY**

**PRIMARY ROUTES OF EXPOSURE** - Skin and eyes contact, inhalation

**INHALATION** - Respiratory tract irritant. Severe injury is usually avoided by the self-limiting coughing and sneezing symptoms.

**INGESTION** - CORROSIVE ! Ingestion of caustic soda liquid can cause perforation of the esophagus and stomach. Abdominal pain, nausea, vomiting and general gastro-intestinal upset can be expected.

**SKIN CONTACT** - CORROSIVE ! Will cause severe chemical burns and tissue destruction. Immediately flush with water. Seek medical attention.

**EYE CONTACT** - Will cause severe and possible permanent eye damage. Continuously flush eyes with large amounts of water for at least 15 minutes. Seek medical attention.

**CHRONIC TOXICITY**- No Data Found

## **Section 7: Emergency & First Aid Procedures**

**INHALATION** - Move person to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

**EYE OR SKIN CONTACT** - In case of contact, immediately flush eyes and skin with plenty of water (soap and water for skin) for at least 15 minutes, while removing contaminated clothing and shoes. Hold eyelids open during this flushing with water. Call a physician. If skin feels slippery, caustic may still be present in sufficient quantities to cause rash or burn. Continue washing until slick skin feeling is gone. Thoroughly clean contaminated clothing and shoes before reuse or discard.

**INGESTION** - If swallowed, give at least 3-4 glasses of water or acidic beverages ( tomato or orange juice, carbonated soft drinks). Do not induce vomiting. Do not give anything by mouth to an unconscious or convulsing person. Get medical attention.

**NOTES TO PHYSICIAN** - Treat symptomatically.

## **Section 8: Occupational Control Measures**

**VENTILATION REQUIREMENTS** - Local exhaust - to meet the exposure requirements and avoid mist.

**PERSONAL RESPIRATORS: ( NIOSH APPROVED )** - Dust/mist respirators recommended for all personnel working in or about an area of potential mist exposure.

**SKIN PROTECTION REQUIREMENTS** - Wear impervious protective clothing; including boots; gloves; lab coat; apron or coveralls to prevent skin contact. Preferred Materials: Nitrile, Neoprene, PVC

**EYE PROTECTION REQUIREMENTS** - Use chemical safety goggles impervious to product. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in immediate work area.

NOTE: ALL PROTECTIVE EQUIPMENT MUST CONFORM WITH 29 CFR 1910.132.

## **Section 9: Handling & Storage**

Store and handle only in containers suitably lined with or constructed of materials specified for this product. Keep separate from incompatibles.

## **Section 10: Regulatory Information**

### **DOT HAZARD CLASS**

8

### **DOT PLACARD REQUIRED**

Corrosive - UN 1824

### **DOT LABEL**

Corrosive - 8

### **REPORTABLE QUANTITY**

1,000 lbs - / 454 Kgs.

### **NFPA / HMIS RATINGS**

Health - 3

Flammability - 0

Reactivity - 1

**TSCA** - Sodium Hydroxide is on the TSCA inventory under CAS. NO.1310-73-2.

**OSHA** - Listed as a "Hazardous Chemical" as defined in 29 CFR 1910.1200 ( Hazcom).

### **CERCLA**

Listed in table 302.4 of 40 CFR part 302 as a hazardous substance with a reportable quantity of 1,000 pounds. Release to air, land or water which exceed the RQ must be reported to the National Response Center, 1-800-424-8802.

### **EUROPE EINECS**

This product is listed on EINECS. ( 204-825-9)

### **CANADA DSL**

This product is listed on the Canadian DSL.

### **AUSTRALIA AICS**

This product is listed on AICS

### **KOREA ECL**

This product is listed on MITI.

### **JAPAN MITI ( ENCS )**

This product is listed on MITI.

### **SARA TITLE III**

SARA ( 311,312 ) HAZARD CLASS: Acute Health Hazard. Reactive Hazard.

SARA ( 313 ) CHEMICALS: Not Listed

SARA Section 302: Not listed as an Extremely Hazardous Substance/

### **CANADIAN REGULATIONS (WHMIS)**

- Class E - Corrosive Material.
- Sensitization to product - None known.
- Reproductivity Toxicity - None known.
- Odor Threshold - No Odor.
- Product Use - Neutralization, chemical processing.

The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, K.A. Steel Chemicals makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, K.A. Steel Chemicals will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representation, or warranties, either express or implied, of merchantability fitness for a particular purpose or of any nature are made hereunder with respect to the information set forth herein or to the product to which the information refers.



# Material Safety Data Sheet

CAUSTIC SODA 20%-50%  
5046-%

## Section 01 - Product and Company Identification

SAL Chemical Company  
3036 Birch Drive  
Weirton, WV 26062

**Date Issued:** 02.23.1995  
**Revision Date:** 07.27.2010

**For More Information Call:**  
304-748-8200  
800-879-1725

**Emergency Phone Number:**  
ChemTrec: 800-424-9300  
24 Hours/Day—7 Days/Week

**TRADE NAME:** CAUSTIC SODA 20%-50%  
**SYNONYMS:** 20-50% Sodium Hydroxide Solution  
**CAS NUMBER:** 1310-73-2

## Section 02 - Composition

| INGREDIENT              | PERCENT | CAS #     | TLV                | PEL                |
|-------------------------|---------|-----------|--------------------|--------------------|
| Sodium Hydroxide (NaOH) | 20-50%  | 1310-73-2 | 2MG/M <sup>3</sup> | 2mg/m <sup>3</sup> |
| Water                   | 50-80%  | 7732-18-5 |                    |                    |

## Section 03 - Physical Data

|                               |                                    |                              |       |
|-------------------------------|------------------------------------|------------------------------|-------|
| <b>APPEARANCE &amp; ODOR:</b> | Colorless to slightly white liquid |                              |       |
| <b>ODOR:</b>                  | Odorless                           |                              |       |
| <b>pH:</b>                    | 13                                 | <b>% VOLATILE BY VOLUME:</b> | 40%   |
| <b>SPECIFIC GRAVITY:</b>      | 1.3-1.5                            | <b>VAPOR DENSITY:</b>        | N/A   |
| <b>BOILING POINT:</b>         | 284° F                             | <b>FREEZING POINT:</b>       | 53° F |
| <b>SOLUBILITY IN WATER:</b>   | 100% - Complete                    | <b>EVAPORATION RATE:</b>     | N/A   |

## Section 04 - Fire and Explosion Data

**FLASH POINT:** None reported

**EXTINGUISHING MEDIA:** Small fires: use dry chemical, CO<sub>2</sub> or regular foam.  
Large Fires: avoid using water spray since product generates heat. Use fog or regular foam

**SPECIAL FIRE FIGHTING PROCEDURES:** SCBA since fire may produce toxic thermal decomposition products. Wear full protective gear. Apply cooling water to containers until fire is out.

**UNUSUAL FIRE/EXPLOSION HAZARDS:** Sodium Hydroxide can become very hot when in contact with water

**NFPA RATINGS:** Health: 3 - Flammability: 0 - Reactivity: 1 - Special Hazard: W

As the result of our inspection(s), this certifies that the material identified above, blended by SAL Chemical Company, Inc., meets or exceeds all conformance standards listed above, and fully complies with the customer's order. In no way is this certificate intended to alter SAL Chemical's General Terms & Conditions of the parties' contract.

## Section 05 · Reactivity Data

|                                   |   |
|-----------------------------------|---|
| <b>STABILITY:</b>                 | Stable at room temperature  |
| <b>HAZARDOUS POLYMERIZATION:</b>  | Can Not Occur   |
| <b>CONDITIONS TO AVOID:</b>       | Avoid generation of sodium hydroxide mists and contact with products listed below as well as mineral acids such as 96% sulfuric, 36% hydrochloric, 70% nitric and 48% hydrofluoric.                             |
| <b>INCOMPATIBILITY:</b>           | Water may cause sodium hydroxide to steam and splatter. Sodium hydroxide can react with mineral acids to form corresponding salts. It can be very corrosive to metals such as aluminum, tin, zinc and steel.    |
| <b>HAZARDOUS DECOMP PRODUCTS:</b> | Thermal oxidative decomposition of Sodium Hydroxide can produce toxic sodium oxide and sodium peroxide fumes. Contact with metals such as those listed above may cause the formation of flammable hydrogen gas. |

## Section 06 · Health Data

### PRIMARY ROUTES OF ENTRY AND TARGET ORGANS

|                         |   |
|-------------------------|---|
| <b>INHALATION:</b>      | May cause burns and pulmonary edema.  |
| <b>INGESTION:</b>       | Causes immediate burns of mouth, throat and stomach.  |
| <b>SKIN (DERMAL):</b>   | Contact causes a slippery, soapy feeling that may not begin to burn for a few minutes even though the skin is being corroded. |
| <b>EYES:</b>            | The cornea begins to corrode on contact.  |
| <b>CHRONIC EFFECTS:</b> | Dermatitis may result after repeated exposure to dilute solutions   |

## Section 07 · First Aid

|                                |  |
|--------------------------------|--|
| <b>EYES:</b>                   | Gently lift eyelids and flush with water. Don't allow victim to keep eyes tightly shut. Consult a physician immediately!   |
| <b>BREATHING (INHALATION):</b> | Remove to fresh air and support breathing as needed.   |
| <b>SWALLOWING (INGESTION):</b> | Drink at least 1-2 glasses of water followed by vinegar or fruit juice to neutralize the poison. DO NOT induce vomiting. Do not give anything by mouth to an unconscious or convulsing person. Get medical attention |
| <b>SKIN (DERMAL):</b>          | Quickly remove contaminated and rinse with cold water at least 15 minutes. Consult a physician.  |
| <b>CARCINOGENICITY:</b>        | NTP: No - IARC: No - ACGIH: No   |
| <b>HMS RATINGS:</b>            | Health: 3 - Flammability: 0 - Reactivity: 1  |

## Section 08 · Employee Protection

|                                |   |
|--------------------------------|---|
| <b>RESPIRATORY PROTECTION:</b> | Dust/Mist, SCBA for confined space  |
| <b>VENTILATION:</b>            | Local exhaust to keep level below OSHA PEL  |
| <b>PROTECTIVE CLOTHING:</b>    | Wear impervious protective clothing; including boots, gloves, apron to prevent skin contact |
| <b>EYE PROTECTION:</b>         | Chemical goggles  |

### Section 09 · Spill and Disposal Data

**IN CASE OF SPILL :** Notify safety personnel, isolate area, deny entry and stay upwind of spill. Hazmat personnel should protect against vapor inhalation and skin and eye contact. Absorb small spills with flyash or cement powder. Neutralize spill with vinegar of dilute acid. For large spills, dike flow using soil or sand bags. Contain for later disposal.

**WASTE DISPOSAL:** Contact your supplier or licensed contractor for detailed recommendations. Follow Federal, State and local regulations.

### Section 10 · Handling and Storage

**HANDLING & STORAGE:** Avoid physical damage to containers. Store in a dry, well ventilated area away from water, acids, metals, flammable liquids and organic halogens. Keep containers tightly closed. Store containers in areas equipped with trapped floor drains, curbs or gutters.

### Section 11 · Regulatory Information

|                                    |   |
|------------------------------------|---|
| <b>PROPER DOT SHIPPING NAME:</b>   | Sodium Hydroxide, Solution                                |
| <b>DOT HAZARD CLASS:</b>           | 8   |
| <b>DOT LABEL/PLACARD REQUIRED:</b> | Corrosive—UN 1824   |
| <b>PACKAGING GROUP:</b>            | II  |
| <b>REPORTABLE QUANTITY:</b>        | 1000 lbs.   |
| <b>RCRA STATUS:</b>                | Hazardous waste; Characteristic of corrosivity            |
| <b>SARA SECTION 311/312:</b>       | Immediate - Delayed - Fire - Pressure - Reactivity<br>X X |
| <b>SARA SECTION 302/313:</b>       | Not Listed  |
| <b>CERCLA REPORTABLE QTY:</b>      | 1000 lbs. listed as CERCLA Hazardous Substance            |

### Section 12 · Additional Information

**DISCLAIMER:** The information contained within this Material Safety Data Sheet is for the specific material described only and may not be valid if the material is used in combination with any other materials or process. The user is responsible to determine the completeness of the information and suitability for the user's own particular use. To the knowledge and belief of Sal Chemical, the information is accurate and reliable as of the date indicated but Sal Chemical makes no express implied warranty of merchantability for the material or for the information.



# MATERIAL SAFETY DATA SHEET

Page: 1  
DATE PREPARED: 8/1/13  
MSDS No: ShaleClear Marcellus  
ShaleClear Marcellus

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## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: **ShaleClear Marcellus**

**MANUFACTURER:**  
Shalewater Solutions  
37 Grande Meadows Drive  
Suite 201  
Bridgeport, WV 26330  
Ph: (855) 463-7224  
www.shalewater.com

**24 HR. EMERGENCY TELEPHONE  
NUMBERS:**  
Emergency Phone 800-535-5053

NFPA Rating  
HEALTH: 2  
FLAMMABILITY: 0  
REACTIVITY: 0

HMIS Rating  
HEALTH: 2  
FLAMMABILITY: 0  
REACTIVITY: 0

### EMERGENCY OVERVIEW

Corrosive Liquid! Clear colorless to yellow liquid with no appreciable odor. May cause skin and eye irritation that can become severe on prolonged contact. May be harmful if swallowed. Inhalation of spray or mist may irritate respiratory tract.

---

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

|                          | <u>wt.%</u> | <u>CAS Registry #</u> |
|--------------------------|-------------|-----------------------|
| Trade Secret Ingredients | 100         |                       |

### OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

|                          | <u>EXPOSURE LIMITS</u>     |                            |
|--------------------------|----------------------------|----------------------------|
|                          | <u>OSHA PEL</u>            | <u>ACGIH TLV Supplier</u>  |
| Trade Secret Ingredients | *15 mg/m <sup>3</sup> (TD) | Soluble Salts:             |
|                          | *5 mg/m <sup>3</sup> (RF)  | *2 mg/m <sup>3</sup> (TWA) |

\*Aluminum metal, (as Al)

---

## 3. HAZARDS IDENTIFICATION

### POTENTIAL HEALTH EFFECTS

#### EYES:

Direct eye contact may cause irritation, redness, and swelling. Prolonged exposure to Aluminum salts may cause conjunctivitis.

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**SKIN:**

Expected to be irritating, especially on prolonged contact or repeated contact.

**INGESTION:**

May cause irritation of gastrointestinal tract, nausea and vomiting.

**INHALATION:**

Inhalation of mist or spray may irritate respiratory tract.

**EFFECTS OF OVEREXPOSURE**

**ACUTE OVEREXPOSURE:** Possible eye, skin and respiratory tract irritation.

**CHRONIC OVEREXPOSURE:** May aggravate existing skin, eye and lung conditions. Persons with kidney disorders have an increased risk from exposure based on general information found on aluminum salts.

---

## 4. FIRST AID MEASURES

**EYES:**

Immediately flush eyes with plenty of water for at least 15 minutes holding eyelids apart to ensure flushing of the entire surface. Washing within one minute is essential to achieve maximum effectiveness. Seek immediate medical attention.

**SKIN:**

Wash thoroughly with soap and water, remove contaminated clothing and footwear. Wash clothing before reuse. Get medical attention if irritation should develop.

**INGESTION:**

DO NOT INDUCE VOMITING. Give large amounts of water followed by milk if available. If vomiting should occur spontaneously, keep airway clear. Get medical attention. Never give anything by mouth to an unconscious person.

**INHALATION:**

Remove victim from contaminated area to fresh air immediately. Get immediate medical attention.

**NOTES TO PHYSICIAN:** Aluminum soluble salts may cause gastroenteritis if ingested. Treatment includes the use of demulcents. Note: Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

---

## 5. FIRE FIGHTING MEASURES

**EXTINGUISHING MEDIA:**

Water Spray, Carbon Dioxide, Foam, Dry Chemical

**EXPLOSION HAZARDS:**

May produce hazardous fumes or hazardous decomposition products.

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**FIRE FIGHTING PROCEDURES:**

Product is a water solution and nonflammable. In a fire, this product may build up pressure and rupture a sealed container; cool exposed containers with water spray. Use self-contained breathing apparatus in confined areas; avoid breathing vapors or dust.

**AUTOIGNITION TEMPERATURE:**

NAPL

**FLAMMABLE LIMITS IN AIR, % BY VOLUME:**

LOWER FLAMMABILITY LIMITE: NAPL

UPPER FLAMMABILITY LIMITE: NAPL

**FLASHPOINT:**

NAPL

---

## 6. ACCIDENTAL RELEASE MEASURES

**GENERAL PROCEDURES:**

Stop leaks. Clean up spill immediately. Build dikes as necessary to contain flow of large spills. Do not allow liquid to enter stream or waterways. For small spills, use soda ash to neutralize, an inert material to absorb, or wash product to a chemical sewer. Place contaminated materials into containers and store in a safe place to await proper disposal. Wear adequate personal protective clothing and equipment. Caution use of soda ash may generate carbon dioxide gas. Provide adequate ventilation to spill area. Approved breathing apparatus may be necessary.

---

## 7. HANDLING AND STORAGE

**PRECAUTIONARY STATEMENTS:**

CAUTION!

CORROSIVE LIQUID!

MAY CAUSE IRRITATION

Avoid contact with eyes, skin, and clothing.

Avoid breathing mist or spray.

Wear chemical splash goggles, gloves, and protective clothing when handling.

Use with adequate ventilation and employ respiratory protection where mist or spray may be generated.

Wash thoroughly after handling.

Do not take internally.

May be harmful if swallowed or inhaled.

Keep away from heat and open flame.

Keep container closed when not in use.

FOR INDUSTRIAL USE ONLY.

**HANDLING/STORAGE REQUIREMENTS:**

Store in a cool, dry place away from direct heat. Keep container tightly closed when not in use. Do not store in unlined metal containers. Product may slowly corrode iron, brass, copper, aluminum and mild steel.

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### VENTILATION REQUIREMENTS:

Local exhaust ventilation recommended.

### PERSONAL PROTECTION:

#### EYE PROTECTION:

Chemical splash goggles and/or face shield.

#### SKIN PROTECTION:

Chemical resistant gloves.

#### RESPIRATORY PROTECTION:

When exposures exceed the PEL, use NIOSH/MSHA approved respirator in accordance with OSHA Respiratory Protection Requirements under 29 CFR 1910.134

#### OTHER REQUIRED EQUIPMENT:

Standard work clothing and work shoes. Safety shower and eyewash located in immediate area.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Odor: No appreciable odor

Appearance: Clear to slightly hazy, colorless to yellow liquid

pH: 0.5-2.0

Percent Volatile: 45-55% (Water)

Boiling Point: NAV

Freezing Point: NAV

Vapor Pressure: NAV

Solubility in Water: Complete

Evaporation Rate: 1

Specific Gravity (Water=1): 1.32-1.382

Density @ 25C: 11.36-11.52 lb/gal.

Melting Point: NAV

Evaporation Rate: NAV

Vapor Density (Air=1): NAV

Viscosity: 20-60 cps

---

## 10. STABILITY AND REACTIVITY

STABLE: Yes

HAZARDOUS POLYMERIZATION: No

CONDITIONS TO AVOID: None



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## DECOMPOSITION PRODUCTS:

Thermal decomposition may release toxic and/or hazardous gases such as Cl<sub>2</sub> and HCl

## INCOMPATIBLE MATERIALS:

Product is incompatible with alkalis.

---

## 11. TOXICOLOGICAL INFORMATION

Test data is based on a product of similar composition.

Conclusions are drawn from sources other than direct testing.

This product is expected to be an irritant to the skin, eyes and mucous membrane. Irritation may become severe on prolonged contact.

---

## 12. ECOLOGICAL INFORMATION

|        |                      |     |
|--------|----------------------|-----|
| BOD5:  | mgO <sub>2</sub> /mg | NAV |
|        | ppm                  | NAV |
|        | Biodegradable, %:    | NAV |
| BOD28: | mgO <sub>2</sub> /mg | NAV |
|        | ppm                  | NAV |
|        | Biodegradable, %:    | NAV |
| COD:   | mgO <sub>2</sub> /mg | NAV |
|        | ppm                  | NAV |
|        | Biodegradable, %:    | NAV |

Aquatic Toxicity:  
Not Available

---

## 13. DISPOSAL CONSIDERATIONS

Dispose of in accordance with all federal, state and local regulations.

---

## 14. TRANSPORT INFORMATION

DOT Proper Shipping Name:

UN3264, CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (POLYALUMINUM CHLORIDE SOLUTION), 8, PG III, ERG# 154.



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Harmonized Tariff Schedule Number: 3824.90.9290

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## 15. REGULATORY INFORMATION

This product does not contain any ingredients subject to the reporting requirements of SARA Title III, Section 313 (40 CFR Part 372).

SARA Section 311/312: Acute and Chronic Health Hazard and Reactive Hazard.  
TSCA: Components found on TSCA inventory.

---

## 16. OTHER INFORMATION

Approval date: 5/24/13

### LEGEND:

NAV=Not Available; NAPL=Not Applicable; NTES=None Established; TRSC=Trade Secret

### MANUFACTURER DISCLAIMER:

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of manufacturer. The data on this sheet relates only to the specific material designated herein. Manufacturer assumes no legal responsibility for use or reliance upon this data.

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# MATERIAL SAFETY DATA SHEET

Page: 1  
DATE PREPARED: 03/14/14  
MSDS No: ShaleBind  
**ShaleBind**

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## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: **ShaleBind**

### MANUFACTURER:

**Shalewater Solutions**  
37 Grande Meadows Drive  
Suite 201  
Bridgeport, WV 26330  
Ph: (855) 463-7224  
[www.shalewater.com](http://www.shalewater.com)

### 24 HR. EMERGENCY TELEPHONE NUMBERS:

Emergency Phone 800-535-5053

---

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

|  | <u>wt.%</u> | <u>CAS Registry #</u> |
|--|-------------|-----------------------|
| Cationic water-soluble polymer in emulsion |             |                       |

---

## 3. HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

#### IMMEDIATE CONCERNS:

Irritating to eyes and skin. Spills produce extremely slippery surfaces.

---

## 4. FIRST AID MEASURES

### EYES:

Rinse thoroughly with plenty of water, also under the eyelids. In case of persistent eye irritation, consult a physician.

### SKIN:

Wash with soap and water as a precaution. In case of persistent skin irritation, consult a physician.

### INGESTION:

This product is not considered toxic based on studies on laboratory animals.

### INHALATION:

Move to fresh air.

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# MATERIAL SAFETY DATA SHEET

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**ShaleBind**

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## 5. FIRE FIGHTING MEASURES

Auto ignition Temperature: Does Not Ignite

---

### EXTINGUISHING MEDIA:

Water, water spray, foam, carbon dioxide (CO<sub>2</sub>), dry powder.

### FIRE FIGHTING PROCEDURES:

Spills produce extremely slippery surfaces.

### FIRE FIGHTING EQUIPMENT:

No special protective equipment required.

### FLASHPOINT:

Does Not Flash

---

## 6. ACCIDENTAL RELEASE MEASURES

### PERSONAL PRECAUTIONS:

No special precautions required.

### ENVIRONMENTAL PRECAUTIONS:

#### WATER SPILL:

Do not contaminate water.

### GENERAL PROCEDURES:

DO NOT FLUSH WITH WATER. Dam up. Soak up with inert absorbent material. If liquid has been spilled in large quantities clean up promptly by scoop or vacuum. Keep in suitable and closed containers for disposal. AFTER CLEANING, flush away traces with water.

---

## 7. HANDLING AND STORAGE

### HANDLING:

Avoid contact with skin and eyes. When preparing the working solution ensure there is adequate ventilation. Do not breathe vapors or spray mist. When using do not smoke.

### STORAGE:

Store in a cool, dry place (0-30 degrees C). Store away from heat. Keep away from sources of ignition. Freezing will affect the physical condition and may damage the material.

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# MATERIAL SAFETY DATA SHEET

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### ENGINEERING CONTROLS:

Use local exhaust if misting occurs. Natural ventilation is adequate in absence of mists.

### PERSONAL PROTECTION

#### EYES AND FACE:

Safety glasses with side shields. Do not wear contact lenses.

---

#### SKIN:

Chemical resistant apron or protective suit if splashing or contact with solution is likely.

#### RESPIRATORY:

In case of insufficient ventilation wear suitable respiratory equipment.

#### PROTECTIVE CLOTHING:

Wear rubber gloves.

#### WORK HYGIENIC PRACTICES:

Wash hands before breaks and at the end of the workday. Handle in accordance with good industrial hygiene and safety practices.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Odor: Aliphatic

Appearance: Milky viscous liquid

Vapor Pressure: 0.13 mmHg at 20°C

### COMMENTS:

pH: 4-9 @ 5 g/L

Water Solubility: See Technical Bulletin

Density: See Technical Bulletin

---

## 10. STABILITY AND REACTIVITY

STABLE: Yes

HAZARDOUS POLYMERIZATION: No

### HAZARDOUS DECOMPOSITION:

Thermal decomposition may produce hydrogen chloride gas, nitrogen oxides (NO<sub>x</sub>), carbon oxides.

### INCOMPATIBLE MATERIALS:

Oxidizing agents may cause exothermic reactions

---

## 11. TOXICOLOGICAL INFORMATION

### EYE EFFECTS:

Mild eye irritation.

### SKIN EFFECTS:

Mild skin irritation.

---

### ACUTE:

Skin: The results of testing on rabbits showed this material to be non-toxic even at high dose levels.

Ingestion: LD50/oral/rat > 5000 mg/kg

Inhalation: This product is not expected to be toxic by inhalation.

### SENSITIZATION:

The results of testing on guinea pigs showed this material to be non-sensitizing.

### SUBCHRONIC:

A two-year feeding study on rats did not reveal adverse health effects. A one-year feeding study on dogs did not reveal adverse health effects. Prolonged skin contact may defat the skin and produce dermatitis.

---

## 12. ECOLOGICAL INFORMATION

### ENVIRONMENTAL DATA:

The product is rapidly eliminated from the aquatic medium through irreversible adsorption onto suspended matter and dissolved organics.

### ECOTOXICOLOGICAL INFORMATION:

The aquatic toxicity is highly mitigated by the presence of dissolved organic carbon in the water. Results obtained using the US EPA "Dirty Water" test show that irreversible adsorption onto suspended matter and dissolved organics (such as humic and other organic acids) present in natural waters, reduces the toxicity to aquatic organisms by a factor of over 10.

Fish: LC50/Danio rerio/96 hr > 10 - 100 mg/L (OECD 203)(Based on the toxicity of the components using the Conventional Method.)

Algae: Algal inhibition tests are not appropriate. The flocculating characteristics of the product interfere directly in the test medium preventing homogenous distribution which invalidates the test.

Daphnia: EC50/Daphnia magna/48 hr > 50 mg/L (OECD 202)(Based on the toxicity of the components using the Conventional Method.)

### DISTRIBUTION:

This product is not expected to bioaccumulate.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### ENGINEERING CONTROLS:

Use local exhaust if misting occurs. Natural ventilation is adequate in absence of mists.

### PERSONAL PROTECTION

#### EYES AND FACE:

Safety glasses with side shields. Do not wear contact lenses.

#### SKIN:

Chemical resistant apron or protective suit if splashing or contact with solution is likely.

#### RESPIRATORY:

In cases of insufficient ventilation wear suitable respiratory equipment.

#### PROTECTIVE CLOTHING:

Wear rubber gloves.

#### WORK HYGIENIC PRACTICES:

Wash hands before breaks and at immediately after handling the product. Handle in accordance with good industrial hygiene and safety practice.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Odor: Aliphatic

Appearance: viscous liquid

Color: milky

Vapor Pressure: 0.002 at 20°C

Melting Point: Not applicable

### COMMENTS:

pH: 6-8@5 g/L

Water Solubility: See Technical Bulletin

Density: See Technical Bulletin

---

## 10. STABILITY AND REACTIVITY

### STABILITY:

Product is stable. No hazardous polymerization will occur. Oxidizing agents may cause exothermic reactions.

### HAZARDOUS DECOMPOSITION:

Thermal decomposition may produce nitrogen oxides (NO<sub>x</sub>), carbon oxides (CO<sub>x</sub>).



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**CHEMICAL FATE INFORMATION:**  
Not readily biodegradable.

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## 13. DISPOSAL CONSIDERATIONS

**PRODUCT DISPOSAL:**

Dispose of in accordance with all federal, state and local regulations.

**EMPTY CONTAINER:**

Rinse empty containers with water and use the rinse water to prepare the working solution. Can be landfilled or incinerated, when in compliance with local regulations.

---

## 14. TRANSPORT INFORMATION

**SPECIAL SHIPPING NOTES:**

Not regulated by DOT, IATA, IMDG

---

## 15. REGULATORY INFORMATION

All components of this product are on the TSCA and DSL inventories.

**UNITED STATES**

**RCRA STATUS:**

Not a hazardous waste.

**STATE REGULATIONS**

**PROPOSITION 65 STATEMENT:**

The following statement is made in order to comply with the CA Safe Drinking Water and Toxic Enforcement Act of 1986. This product contains a chemical known to the State of California to cause cancer: residual acrylamide.

---

## 16. OTHER INFORMATION

Approval date: 12/2/2008

**REVISION SUMMARY**

This MSDS replaces the August 27, 2008 MSDS.

**NFPA CODES**

Fire: 1      Health: 1      Reactivity: 0

**HMIS CODES**

Fire: 1      Health: 1      Reactivity: 0



**SHALEWATER**  
SOLUTIONS

# MATERIAL SAFETY DATA SHEET

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**MANUFACTURER DISCLAIMER:**

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of manufacturer. The data on this sheet relates only to the specific material designated herein. Manufacturer assumes no legal responsibility for use or reliance upon this data.

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# MATERIAL SAFETY DATA SHEET

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DATE PREPARED: 11/27/2012  
MSDS: ShaleFloc  
ShaleFloc

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## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: **ShaleFloc**

### MANUFACTURER:

**Shalewater Solutions**  
**37 Grande Meadows Drive**  
**Suite 201**  
**Bridgeport, WV 26330**  
**Ph: (855) 463-7224**  
***www.shalewater.com***

### 24 HR. EMERGENCY TELEPHONE NUMBERS:

Emergency Phone 800-535-5053

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## 2. COMPOSITION/INFORMATION ON INGREDIENTS

|   | <u>wt. %</u> | <u>CAS Registry #</u> |
|---|--------------|-----------------------|
| Anionic water-soluble polymer in emulsion |              | 33                    |

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## 3. HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

#### IMMEDIATE CONCERNS:

Spills produce extremely slippery surfaces.

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## 4. FIRST AID MEASURES

### EYES:

Rinse thoroughly with plenty of water, also under the eyelids. In case of persistent eye irritation, consult a physician.

### SKIN:

Wash off immediately with soap and plenty of water. In case of persistent skin irritation, consult a physician.

### INGESTION:

The product is not considered toxic based on studies on laboratory animals.

### INHALATION:

Move to fresh air.

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## 5. FIRE FIGHTING MEASURES

**EXTINGUISHING MEDIA:**

Water, water spray, foam, carbon dioxide (CO<sub>2</sub>), dry powder.

**FIRE FIGHTING PROCEDURES:**

Spills produce extremely slippery surfaces.

**FIRE FIGHTING EQUIPMENT:**

No special protective equipment required.

**AUTOIGNITION TEMPERATURE:**

Does not ignite.

**FLASHPOINT:**

Does not flash.

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## 6. ACCIDENTAL RELEASE MEASURES

**ENVIRONMENTAL PRECAUTIONS:**

**WATER SPILL:**

Do not contaminate water.

**GENERAL PROCEDURES:**

DO NOT FLUSH WITH WATER. Dam up. Soak up with inert absorbent material. If liquid has been spilled in large quantities clean up promptly by scoop or vacuum. Keep in suitable and closed containers for disposal. AFTER CLEANING, flush away traces with water.

**COMMENTS:**

No special personal precautions required.

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## 7. HANDLING AND STORAGE

**HANDLING:**

Avoid contact with skin and eyes. When preparing the working solution ensure there is adequate ventilation. When using do not smoke.

**STORAGE:**

Keep in a dry, cool place (0-30 degrees C). When preparing the working solution ensure there is adequate ventilation. Freezing will affect the physical condition and may damage the material.

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## 11. TOXICOLOGICAL INFORMATION

### EYE EFFECTS:

May cause eye irritation with susceptible persons.

### SKIN EFFECTS:

May cause skin irritation with susceptible persons.

### ACUTE:

Skin: This product is not expected to be toxic in contact with the skin.

Ingestion: LD50/oral/rat>5000 mg/kg

Inhalation: This product is not expected to be toxic by inhalation.

### SENSITIZATION:

This product is not expected to be sensitizing.

### SUBCHRONIC:

Prolonged skin contact may defat the skin and produce dermatitis.

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## 12. ECOLOGICAL INFORMATION

### ECOTOXICOLOGICAL INFORMATION:

Fish: LC50/Danio rerio/96 hr >100 mg/L (OECD 203) (Based on the toxicity of the components using the Conventional Method.)

Algae: IC50/Scenedesmus subspicatis/72 h r >100 mg/L (OECD 201)(Based on the toxicity of the components using the Conventional Method.)

Daphnia: EC50/Daphnia magna/48 hr > 100 mg/L (OECD 202)(Based on the toxicity of the components using the Conventional Method.)

### DISTRIBUTION:

This product is not expected to bioaccumulate.

### COMMENTS:

Not readily biodegradable. This product is rapidly eliminated from the aquatic medium through irreversible adsorption onto suspended matter and dissolved organics.

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## 13. DISPOSAL CONSIDERATIONS

### PRODUCT DISPOSAL:

In accordance with all federal, state and local regulations.

### EMPTY CONTAINER:



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Rinse empty containers with water and use the rinse water to prepare the working solution. Can be landfilled or incinerated, when in compliance with local regulations.

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## 14. TRANSPORT INFORMATION

SPECIAL SHIPPING NOTES:  
Not regulated by: DOT, IATA, IMDG.

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## 15. REGULATORY INFORMATION

### UNITED STATES

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA Regulatory: Hazardous waste number: Not applicable

TSCA Status: All components of this product are on the TSCA and DSL inventories.

RCRA STATUS:

Not a hazardous waste.

### STATE REGULATIONS

PROPOSITION 65 STATEMENT:

The following statement is made in order to comply with the CA Safe Drinking Water and Toxic Enforcement Act of 1986. This product contains a chemical known to the State of California to cause cancer: residual acrylamide.

GENERAL COMMENTS:

Reportable Quantity (40 CFR 302): Not applicable

COMMENTS:

Threshold planning quantity (40 CFR 355): Not applicable

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## 16. OTHER INFORMATION

Approval date: 11/27/2012

### NFPA CODES

Fire: 1      Health: 1      Reactivity: 0

### HMIS CODES

Fire: 1      Health: 1      Reactivity: 0

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## MANUFACTURER DISCLAIMER:

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